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1931

GENERAL GUIDE TO THE EXHIBITION HALLS

BY FREDERIC A. LUCAS

Revised by Members of the Staff

SIXTEENTH EDITION

THE AMERICAN MUSEUM OF NATURAL HISTORY

NEW YORK, N. Y.

1931

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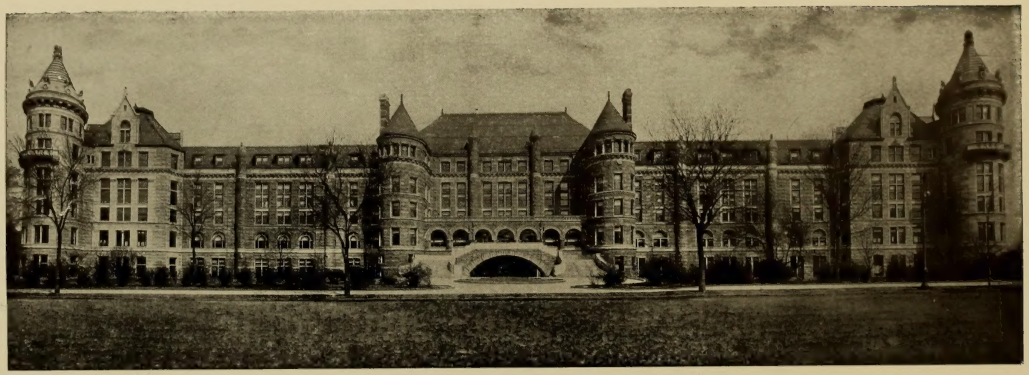

THE AMERICAN MUSEUM OF NATURAL HISTORY

South Façade, facing Seventy-seventh Street

The cornerstone of the Museum, which is intended to occupy all of Manhattan Square, was laid by President Grant in 1874. The material of the building is red granite. The portion completed is about one-third of the Museum as planned, and each façade is to be, like the present, 710 feet long, the most important architecturally to be that fronting Central Park West, which will include the Roosevelt Memorial, erected by the State of New York.

GENERAL GUIDE

TO THE

EXHIBITION HALLS

OF THE

AMERICAN MUSEUM

OF

NATURAL HISTORY

BY

FREDERIC A. LUCAS

Revised by Members of the Museum Staff

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SIXTEENTH EDITION

1931

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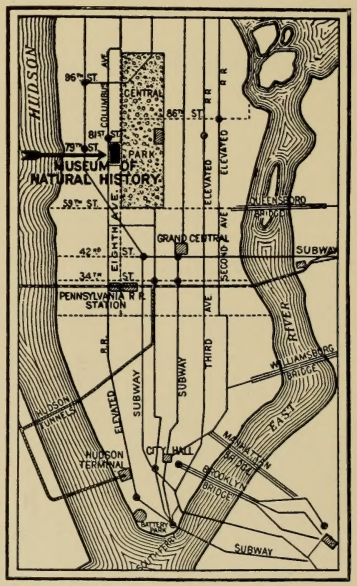
GENERAL INFORMATION

HOW TO THE REACH THE MUSEUM

The Museum is located at 77th Street and Central Park West, and can be reached by the 8th and 9th Avenue surface cars, the 6th or 9th Avenue elevated to 81st Street Station, or by the subway to 72nd or 79th Street station. The Museum is open free every day in the year: on weekdays, including holidays, from 9 A.M. to 5 P.M., on Sundays from 1 to 5 P.M.



From Grand Central Station take Broadway surface car to 77th Street, or subway shuttle to Times Square and local to 79th Street.

From the Pennsylvania Station take the 8th Avenue surface cars, or the subway local to 79th Street.

Telephone: Endicott 2-8500

VISITORS' ROOM, INFORMATION BUREAU, SALES BOOTH

At the right, as one enters from Seventy-Seventh Street, are the Visitors' Room and Information Bureau, where postcards, guide leaflets and other Museum publications are sold, and where visitors may arrange to meet their friends. The Sales Booth also opens on Memorial Hall.

CHECKING BOOTH

At the left of the entrance will be found the Checking Booth for coats and packages, near the office of the Superintendent of Buildings.

Wheel chairs for children and adults may be obtained free of charge.

LECTURES

Announcements of the weekly programs of lectures and meetings of societies will be found in Memorial Hall.

Lecture programs and lists of publications may be obtained free of charge at the Information Bureau.

A Bulletin Board displaying programs of lectures and meetings will be found in the East Corridor, first floor, opposite the elevators.

A map showing the locations of the various expeditions in the field is shown on the south wall of this corridor.

Copies of various publications germane to the Museum's work are displayed in table cases in the Foyer.

NOTE

It is frequently necessary to rearrange the exhibits in order to provide space for new material or to put into effect advanced ideas regarding methods of exhibition. Thus discrepancies may be found between the actual arrangement of the specimens and that noted in the GUIDE. In some cases further information may be obtained from the GUIDE LEAFLETS, which describe exhibits of special interest. See list of Popular Publications, page 136, also obtainable at the Publications Sales Booth, first floor, or at the Museum Library, fifth floor.

SKETCHING AND PHOTOGRAPHING

No permit is necessary for drawing from specimens on exhibition. Chairs may be had on application to the attendant. In case the light is poor apply to the attendant. (Sunlight is not allowed to shine on specimens on account of the injury it causes.)

Permission to photograph specimens should be obtained from the Director.

GUIDING

Free Service: This is offered to public schools and similar educational institutions and to Members (individuals and institutions). In order to secure a guide, an appointment should be made in advance. Please state the day and hour desired, the number to be guided and any special halls to be seen.

For appointments call Endicott 2-8500, Extension 174 or 180.

Groups for the general public are specially conducted on Wednesdays and Fridays at 11:00 A.M. and 3:00 P.M., and on Saturdays at 11:00 A.M. and 4:00 P.M.

Paid Service: This is provided for individuals, clubs or similar institutions not members of the Museum. *Fee:* $1.00 per hour for groups of 4, with 25 cents for each additional person. Groups of 15 from private schools may make special arrangements for guiding at the rate of $2.50 per hour.

RESTAURANT

Adjoining the Birds of the Continents Hall (Second Floor, South Pavilion) is the Restaurant, which is operated as a Museum department, for the convenience of visitors to the Museum, under the efficient direction of a dietitian-manager, and is open from 11:00 A.M. to 4:30 P.M. every day excepting Sunday.

MEMBERSHIP

For the purchase or collection of specimens and their preparation, for research, publication, and additions to the library, the Museum is dependent on its endowment fund and its friends. The latter contribute either by direct subscriptions or through Membership dues. The Membership Fund is of particular importance from the fact that it may be devoted to such purpose as the Trustees may deem most important. There are now more than twelve thousand Members who are contributing to the work of the Museum.

If you believe that the Museum is doing a useful service to science and to education, the Trustees invite you to lend your support by becoming a Member.

The various Classes of Resident Membership are as follows:

Annual Members	(annually)	$10
Sustaining Members	(annually)	25
Life Members		200
Fellows		500
Patrons		1,000
Associate Benefactors		10,000
Associate Founders		25,000
Benefactors		50,000
Endowment Members		100,000

Members enjoy the following privileges

An Annual Pass admitting to the Members' Room and to the Reserved Seat Section at Lectures for Members

Complimentary Tickets admitting to the Members' Room for distribution to friends

Services of an Instructor for guidance through the Museum

Two Single Admission Course Tickets to Spring and Autumn Series of Lectures for Members to distribute to friends

Two Single Admission Course Tickets to Spring and Autumn Series of Lectures for Children of Members

Current numbers of all *Guide Leaflets* on request

Current issues of the Magazine *Natural History*, published by the Museum

A copy of the President's *Annual Report*

ASSOCIATE MEMBERSHIP

(Non-resident)

In order that those residing more than 50 miles from New York City, who can not conveniently attend the lectures for Members, may be associated with the Museum and its work, the class of Associate Members, whose annual dues are $3, was established. These Members have the following privileges:

Current issues of NATURAL HISTORY.

The President's Annual Report, on request.

An Annual Pass admitting to the Members' Room. This large room on the third floor is given over exclusively to Members, and is equipped with every comfort for rest, reading and correspondence.

Two complimentary tickets admitting to the Members' Room for distribution by Members to their friends.

The services of an Instructor for guidance when visiting the Museum.

THE HISTORY AND WORK OF THE MUSEUM

Sixty-one years of public and scientific service have won for the American Museum of Natural History a position of recognized importance in the educational and scientific life of the nation and in the progress of civilization throughout the world. With every passing year the influence of the Museum widens, as is witnessed by the increasing numbers of visitors who daily enter its halls without the payment of any admission fee whatever.

History

The American Museum of Natural History was founded and incorporated in 1869 for the purpose of establishing a Museum and Library of Natural History; of encouraging and developing the study of Natural Science; of advancing the general knowledge of kindred subjects, and to that end of furnishing popular instruction. For eight years its home was in the Arsenal in Central Park, during which time many important collections were secured.

The cornerstone of the present building in Manhattan Square was laid in 1874 by President U. S. Grant; in 1877 the first section (South Central Wing) was completed, and on December 22, 1877, the Museum was formally opened by President R. B. Hayes.

In 1880 the educational work with the schools was inaugurated by Professor Albert S. Bickmore.

In 1893 the Museum was opened to the public on Sundays, and in 1907 it was opened free to the public every day in the year.

The Museum building is one of the largest municipal structures in the City, and has cost to date approximately $16,000,000. The South Façade is 710 feet in length; the total floor area is about fifteen acres. The structure is designed when completed to occupy all of Manhattan Square.

Administration and Support

The building is erected and largely maintained by the City, through the Department of Parks. Building funds are provided for by issues of Corporate Stock, which have been made at intervals since 1871. The annual appropriation, known as the Maintenance Fund, is devoted to the heating, lighting, repair and supervision of the building and care of the collections.

The Museum is under the control of a self-perpetuating Board of Trustees, which has the entire direction of its activities as well as the guardianship of all the collections and exhibits. The Trustees give their services without remuneration.

The funds which enable the Trustees to purchase specimens, to carry on explorations and various forms of scientific work, to prepare and publish scientific papers and to enlarge the library, are contributed by the Trustees, Members and other friends.

The interest of the Endowment Fund, which includes the munificent bequest of Mr. and Mrs. Morris K. Jesup (1909–1917), may be used for additions to the collections, research, and for publication. It cannot be used for the care or repair of the building, construction of cases or other maintenance work for which the City provides.

The Membership Fund, derived from the subscriptions of Members, may be devoted to any purpose and is of particular importance in promoting the educational work and growth of the Museum.

Voluntary contributions may be used for general purposes or for such special object as the donor may designate; some of the most valuable and important collections have been obtained by such gifts, as for example the Morgan collection of gems and the Juilliard collection of ancient Peruvian pottery and textiles.

Definition of a Museum

In the last edition of the Century Dictionary a museum is defined as: "A collection of natural objects, or of those made or used by man, placed where they may be seen, preserved, and studied. Neither the objects themselves, nor the place where they are shown, constitute a museum; this results from the combination of objects, place, and purpose, display being an essential feature. The objects, or specimens, may be shown for general purposes only, or for the illustration of some subject or idea, the tendency of modern museums being, by the display of objects and the manner in which they are arranged and labeled, to illustrate some fact in nature or in the history of mankind."

And E. Ray Lankester as Director of the British Museum of Natural History stated that:

Purposes of Museums

"The purposes of a great national museum of natural history are: (1) To procure by its own explorers or by the voluntary assistance of independent naturalists the actual specimens upon which accurate knowledge of the animals, plants, and minerals of the earth's surface, and more especially of the national territory, is based; to preserve and arrange these collections for study by expert naturalists, and to facilitate, directly or indirectly, the

publication (in the form of catalogues or monographs) of the knowledge so obtained—with a view to its utilization, not only in the progress of science, but in the service of the State. (2) To exhibit in the best possible way for the edification of the public, at whose charges these collections are made and maintained, such specimens as are fitted for exposure in public galleries, with a view to the intelligent and willing participation of the people in the maintenance of the Museum."

As the Museum is emphatically for the people, special attention is given to making the exhibits attractive and interesting as well as instructive.

While The American Museum of Natural History cannot claim to have originated the idea of displaying animals amid their natural surroundings, it was the first large museum in this country to adopt this method, which it has since carried out on a large scale in the well-known habitat groups (see *Guide Leaflet*, No. 53, "The Story of Museum Groups"). How it has been developed, the visitor may judge by comparing the group of Robins and the Orizaba, Wolf or Hopi Groups.

In this Museum were also developed the methods of preparing and mounting the skeletons of extinct animals that have resulted in such mounts as *Brontosaurus* and *Tyrannosaurus*, and the series showing the development of the horse, so that they might be something more than an assemblage of uninteresting bones.

The Museum maintains exhibits "for the edification of the public." The collections are brought together through gifts, exchanges with other institutions, through purchases and by means of explorations in various parts of the world.

How These Purposes are Carried out

The educational work performed by these specimens and their accompanying labels is supplemented by lectures and publications of a popular nature. A course of evening lectures is given every Spring and Fall for the Members, to which admission is to be had by ticket; also courses of Science Stories are given on Saturday mornings for the children of members. Other series, under the direction of the Museum's Department of Public Education, are given for the children of the Public Schools; to students of the high schools, training schools, and colleges, also cultural courses for teachers. Special lectures for the blind are provided for by the Jonathan Thorne Memorial Fund.

Lectures

Scientific Societies meet at the Museum and from time to time offer lectures of general interest.

Radio talks are given in connection with some of the activities of the Museum.

The publications of the Museum are noted on pages 130 and 136.

STATISTICS OF NUMBERS REACHED BY THE MUSEUM AND ITS EDUCATIONAL EXTENSION SYSTEM

	1925	1926	1927	1928	1929
Board of Education Lectures	26,968	10,460	10,914	12,342	——
Lectures to School Children and classes visiting the Museum for Study	133,386	138,514	145,304	172,549	157,168
Meetings of Scientific Societies and Other Meetings and Lectures	37,389	34,976	47,680	27,461	45,936
Total	197,743	183,950	203,898	212,352	203,104
Attendance in Exhibition Halls	1,578,147	1,886,315	2,088,978	688,879	712,529
Total attendance for all Purposes	1,775,890	2,070,265	2,292,876	901,231	915,633
Lectures to Pupils in the Schools	27,055	33,255	20,421	45,718	26,456
Number reached by Motion Picture Service	333,097	530,955	1,123,704	1,576,249	1,725,865
Number reached by Lantern Slide Service	3,941,494	4,358,423	6,866,112	9,734,122	8,550,181
Number reached by Circulating Collections	977,384	798,382	1,679,589	2,282,272	1,857,729
Grand Total	7,054,920	7,791,280	11,982,702	14,539,592	13,075,864

ENTRANCE ARCHWAY

Bench Mark

Under the arch on Seventy-seventh Street, before entering the Museum, one notices the "Bench Mark" established by the U. S. Geological Survey in 1911, on which are inscribed the latitude and longitude, 40° 46′ 47.17″ N., 73° 58′ 41″ W., and height above sea level, 86 feet.

Glacial Pothole

On the right is a "pothole" from Russell, St. Lawrence Co., N. Y., formed by an eddy in the waters of a stream beneath the melting ice of the glacier that covered northern New York State. The stream carried pebbles that, whirled around by the eddy, cut and ground this hole, which is two feet across and four feet deep.

Glacial Grooves

On the left is a large slab of fossiliferous limestone from Kelley Island in Lake Erie near Sandusky, whose surface has been smoothed, grooved and scratched by the stones and sand in the bottom of the vast moving ice sheet or glacier that covered the northeastern part of North America during the Glacial epoch.

KEY TO EXHIBITION HALLS

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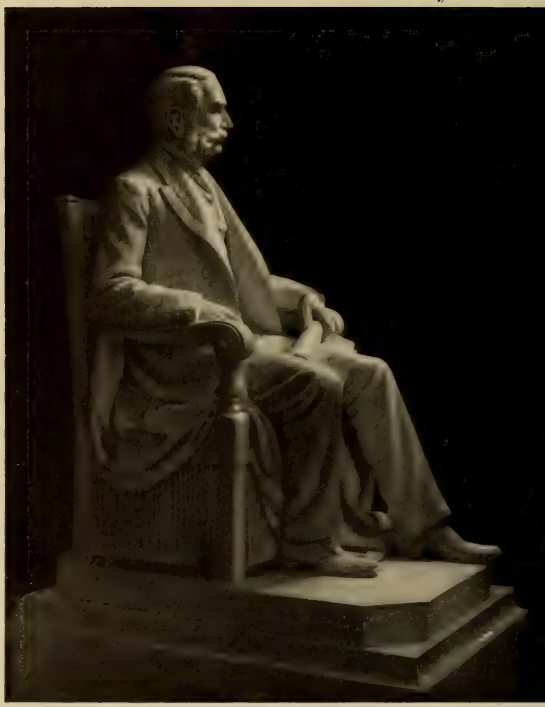
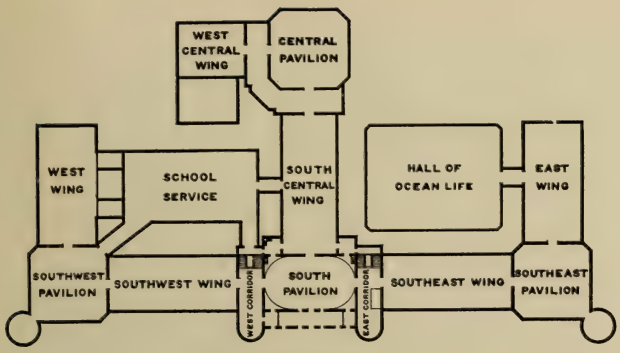
Asia, Collections from	Third Floor,	Southwest Pavilion	101
Astronomy	First Floor,	West Corridor	39
Auditorium	First Floor,	North Corridor	38
Auduboniana	Third Floor,	West Corridor	97
Birds, Local	Second Floor,	West Corridor	70
Birds of the Continents (Habitat Groups)	Second Floor,	South Pavilion	58
Birds of North America (Habitat Groups)	Third Floor,	South Central Wing	89
Birds of the World	Second Floor,	South Central Wing	66
Caves	Fourth Floor,	South Central Wing	119
Central America	Second Floor,	Southwest Wing	71
China	Third Floor,	Southwest Pavilion	101
Darwin Hall	First Floor,	Southeast Pavilion	21
Dinosaurs	Fourth Floor,	East Wing	112
Education Hall	First Floor,	School Service Wing	50
Eskimo Collection	First Floor,	North Corridor	37
Fishes, Recent	First Floor,	East Wing	29
Food Economics	First Floor,	Education Hall	50
Fossil Invertebrates	Fourth Floor,	South Central Wing	119
Fossil Fishes	Fourth Floor,	Southeast Tower	111
Fossil Mammals (Mastodon)	Fourth Floor,	South Pavilion	105
Fossil Mammals (Horses, Camels, etc.)	Fourth Floor,	Southeast Wing	107
Fossil Reptiles	Fourth Floor,	East Wing	112
Gems and Precious Stones	Fourth Floor,	Southwest Wing	123
Geology, Historical	Fourth Floor,	South Central Wing	121
Horse, Evolution of	Fourth Floor,	Southeast Wing	107
Horse, under Domestication	Fourth Floor,	West Corridor	122
Indians of South America	Third Floor,	Southwest Wing	97
Indians of the North Pacific Coast	First Floor,	South Central Wing	34
Indians of the Plains	First Floor,	Southwest Pavilion	42
Indians of the Southwest	First Floor,	West Wing	45
Indians of the Woodlands	First Floor,	Southwest Wing	40
Information Bureau	First Floor,	South Pavilion	17
Insects	Third Floor,	Southeast Pavilion	83
Invertebrates	First Floor,	Southeast Pavilion	21
Library	Fifth Floor,	West Corridor	129
Mammals of North America	Second Floor,	Southeast Wing	58
Mammals of the World (Synoptic Series)	Third Floor,	Southeast Wing	80
Man, Early	Fourth Floor,	South Pavilion	105
Members' Room	Third Floor,	East Corridor	80
Memorial Hall	First Floor,	South Pavilion	17
Meteorites	First Floor,	South Pavilion	17
Meteorites	First Floor,	North Corridor	37
Mexico	Second Floor,	Southwest Wing	71
Minerals	Fourth Floor	Southwest Wing	123
Ocean Life Hall	First Floor,	Southeast Court	32
Pacific Islands Collections	Fourth Floor,	Southwest Pavilion	126
Peru	Third Floor,	Southwest Wing	97
Philippine Collections	Fourth Floor,	West Wing	128
Prehistoric Man	Second Floor,	Southwest Pavilion	76
Public Health	First Floor,	Education Hall	50
Reptiles and Amphibians	Third Floor,	East Wing	87
Restaurant	Second Floor,	South Corridor	58
Shells	First Floor,	Southeast Court	32
Visitors' Room	First Floor,	Right of Entrance	17
Whales	First Floor,	Hall of Ocean Life	32
Woods of North America	First Floor,	Southeast Wing	19

The halls are named according to the position they will have in the completed Museum building, which will consist of four long facades facing east, west, north and south respectively, each connected with the center of the quadrangle formed by a wing extending between open courts. Thus the hall at the eastern end of the south facade (the only facade completed) becomes the "southeast pavilion."



STATUE OF MORRIS K. JESUP IN MEMORIAL HALL

Mr. Jesup, President of The American Museum of Natural History for m
than a quarter of a century, was a staunch supporter of the institution's two ai
to be a great educational institution for the people and also a center for activity
scientific research



FIRST FLOOR

South Pavilion

At the right of the entrance are The Visitors' Room and Information Bureau, where post cards, guide leaflets and other museum publications are sold and where visitors may arrange to meet their friends. The Sales Booth also opens on Memorial Hall.

Wraps and packages may be checked at the desk at the left of the entrance, near the office of the Superintendent, and wheel chairs for children and adults may be obtained free of charge.

MEMORIAL HALL

From the lobby the visitor enters Memorial Hall and faces the statue of Morris K. Jesup, a Founder, Trustee and Benefactor of the Museum, and for twenty-seven years its President.

In niches around the wall are busts of noteworthy pioneers of Science in America, and circling the hall is a portion of the collection of meteorites, comprising the larger examples, among them Ahnighito, weighing 36.5 tons, the largest meteorite known, brought from Greenland by Peary in 1897, and Willamette, weight 15 tons, the largest meteorite found in the United States, and the most curious. The general collection of meteorites in in the North Corridor.

East Corridor

Leaving the statue on the left and "Willamette" meteorite on the right, and going east, the visitor enters the East Corridor where the elevators are located. On the wall is a section of the globe, mapping the north polar region and showing the routes traversed by sledge and airplane. Here are the sledges that with Peary and Amundsen, reached the North and South Poles, respectively, also photographs and

THE WILLIAMETTE METEORITE

The largest meteorite so far found in the United States and the most interesting yet discovered
Gift of Mrs. William E. Dodge, 1906

objects illustrative of the Amundsen-Ellsworth and Byrd north polar flights.

Seismograph

In a room at the north end of this corridor is the large Mainka seismograph for recording the occurrence of earthquakes. This was given to the New York Academy of Sciences by Emerson McMillin, and by the Academy deposited in the Museum.

Elevators

The Elevators start at intervals from the East Corridor, at the entrance to the hall of Trees of North America. The visitor may either take an elevator to the fourth floor and visit the halls as he descends, or choose his hall from the *General Guide* or from the *Directory* opposite the elevators.

Southeast Wing

JESUP COLLECTION OF TREES OF NORTH AMERICA

To the east of the elevators is the *Hall of Trees of North America*, containing a nearly complete collection of the native trees north of Mexico, presented by Morris K. Jesup. On the right is a bronze tablet, by J. E. Fraser, the gift of J. J. Clancy, depicting Mr. Jesup as he walked in his favorite wood at Lenox, Massachusetts, and in front a bust of Charles Sprague Sargent under whose direction the collection was brought together. At the farther end is a bust of John Muir, by Malvina Hoffman, presented by Mrs. E. H. Harriman.

In the center of the hall is the trunk of a fossil tree 45 feet long and several million years old.

To the left is a section of one of the Big Trees of California, sixteen feet in diameter and 1341 years old. (See *Guide Leaflet* No. 42.) It began its growth in the year 550, so that it was nearly a thousand years old before America was discovered. The label, illustrating the conclusions reached by Ellsworth Huntington as the result of long study, shows how the climate of the past is recorded by the trees, and how great historical events are related to great changes in climate.

The other specimens in the hall show cross, longitudinal and oblique sections of the wood finished and unfinished, and the labels give the distribution of the species, the characteristics of the wood and its economic uses. The trees are grouped by families and the location of each family will be found on the floor plans in the first case on either side of the hall. The reproductions of the flowers, leaves and fruits are instructive; this work is done in the Museum laboratories.

(See also *Guide Leaflet* No. 42, "The Big Tree and Its Story.")

MAGNOLIA IN THE FORESTRY HALL

Each of the five hundred species of trees in North America is represented by a sec-
tion of trunk five feet long, some of a diameter not found in the country's forests to-day
Many of the specimens are accompanied by reproductions of leaves, flowers and fruit
accurately copied from life in the Museum laboratories. Most noteworthy among them i
the magnolia shown here, but there are many beautiful examples of spring flowers and
autumn foliage.

Southeast Pavilion

INVERTEBRATES

At the extreme east is *Darwin Hall of Evolution*, devoted chiefly to the invertebrate animals (those which do not possess a backbone) and to groups illustrating biological principles. Facing the entrance is a bronze bust of Darwin by William Couper, presented by the New York Academy of Sciences on the occasion of the Darwin centenary in 1909.

Darwin Hall

FAMILY TREE OF ANIMALS

In the first upright case at the left is a Family Tree of the Animal Kingdom, each class being at present represented by a color sketch, the branches showing the relationships of the various classes.

SYNOPTIC SERIES

The exhibits in the succeeding upright cases comprise examples of the various groups or orders included in the Classes shown on the Family Tree. Passing around the hall from left to right, it will be noted that the progress of evolution is illustrated from the lowest forms, the Protozoa, to the highest, the Primates, which include man. The distinctive characteristics of each group are fully described on the alcove and case labels. Many of the animals are represented by skilfully prepared models in glass and wax showing the animal many times enlarged.

This alcove contains the lowest forms of animal life. All are single-celled individuals. The simplest kinds are abundant in swamps and stagnant water, others are found in myriads in the sea, while the ocean bottom in many localities is covered with them. The exhibits in this alcove are mainly models, some of which represent Protozoa enlarged more than a thousand diameters.

Alcove 1 Protozoa

Sponges are principally of three kinds—those with skeletons or supporting structures of lime, those with structure of silica (i.e., flint) and those with skeletons of horny fiber. The sponges of commerce belong to the latter class. In the dry specimens exhibited, the skeleton only can be seen, the living tissue having been removed. Sponges range in size from the tiny *Grantia* of the New England coast to the gigantic "Neptune's goblets" found in the eastern seas.

Alcove 2 Sponges

In Alcove 3 are shown coral animals and their relatives: among them plantlike hydroids which often are mistaken for sea moss, but which really are a series of polyps living in a colony; jellyfishes with their umbrella-shaped bodies and long, streaming tentacles; brilliantly colored sea anemones, sea fans and sea plumes; the magenta-colored organ-pipe coral, the stony corals, and the precious coral of commerce. Coral polyps, mistakenly called "coral insects,"

Alcove 3 Polyps

are the animals that build up the coral reefs. Especially noteworthy is a reproduction in glass of a Portuguese Man-of-War, which is really a colony of many animals attached to one another and specialized for various functions. A comprehensive synoptic series of stony corals is exhibited in the circular Tower alcove at the southeast corner of the hall.

Alcove 4 Flatworms

The best known species in this group include the tapeworms, whose development and structure are shown by models in the left-hand alcove case. The less familiar free-living flatworms, which inhabit both salt and fresh water, are shown on an enlarged scale by models.

Alcove 5 Roundworms

The roundworms are parasitic, since they live in the digestive canal of mammals. The most familiar is the common roundworm or stomach worm, *Ascaris*, of which an enlarged scale model is exhibited, showing the internal structure.

[*Note for teachers and students.*—Some of the models in each alcove are *anatomical*, i.e., so constructed as to show the internal organs of typical members of each group. In such cases, arbitrary colors chosen to designate the various systems of organs are adhered to consistently throughout the series.]

Alcove 6 Rotifers

The minute wheel animalcules, otherwise called rotifers, comprise many exquisite and grotesque forms, some of which construct tubes of gelatinous substance, sand-grains, etc. A few of the species are parasites, but most of them live a free, active life. They are aquatic and found mainly in fresh water. See window group.

Alcove 7 Sea-Mats and Lamp-shells

The sea-mats are minute, colonial animals of plant-like growth, often occurring as encrustations on shells and seaweed. A few species also occur in fresh water. The lamp-shells shown in this alcove superficially resemble clams, but by structure are more closely related to the sea-mats.

Alcove 8 Sea-Stars and Their Relatives

Alcove 8 is occupied by the sea-stars, brittle stars, sea-urchins, sea-cucumbers and sea-lilies. The sea-star is the pest of the oyster beds, where it feeds on oysters and destroys them in large numbers. The brittle stars are so called because of their habit of dropping off one or more arms when handled or attacked. These, however, are later renewed.

Alcove 9 Annulates

The annulates, typified by the familiar earthworm, are worms whose bodies are made up of rings or segments. They are inhabitants of both fresh and salt water, many kinds living in the mud and sand of the shore while others bore into wood and shells. The bodily structures of these annulates are often very beautiful and interesting.

Arthropods include the familiar crabs, lobsters, myriapods, insects, spiders and their relatives. The number of existing species in this group is greater than that of all the rest of the animal kingdom. No other group comprises so many species useful or harmful to man. On the wall are the two largest specimens of lobster that have ever been taken. They weighed when alive thirty-one and thirty-four pounds, respectively. The largest of the arthropods is the giant crab of Japan, which, like that placed on the wall, may have a spread of about ten feet.

Alcove 10 Arthropods

Crustaceans and Insects

The main exhibit of insects is on the third floor.

The Mollusks are second to the arthropods in the diversity and vast number of forms which they embrace, including marine, fresh-water and land animals. All mollusks have soft bodies, but nearly all of them secrete a shell which in many species is of pearly material (mother-of-pearl). Well-known examples of this group are the common clam and oyster, and enlarged models in the center case show the anatomy of this species. A large collection of mollusks is shown in the Hall of Ocean Life, page 32.

Alcove 11 Mollusks

Models of Clam and Oyster

Vertebrates include the largest, most powerful and most intelligent of animals, the group culminating in man. Among the ancestral forms are the Ascidians, or Sea-squirts, an enlarged model of which is shown in the central case, while others are seen among the animals on the wharf-piles in the window group. Other models in the central case show the development of the egg of typical vertebrates.

Alcove 12 Chordates Including Vertebrates

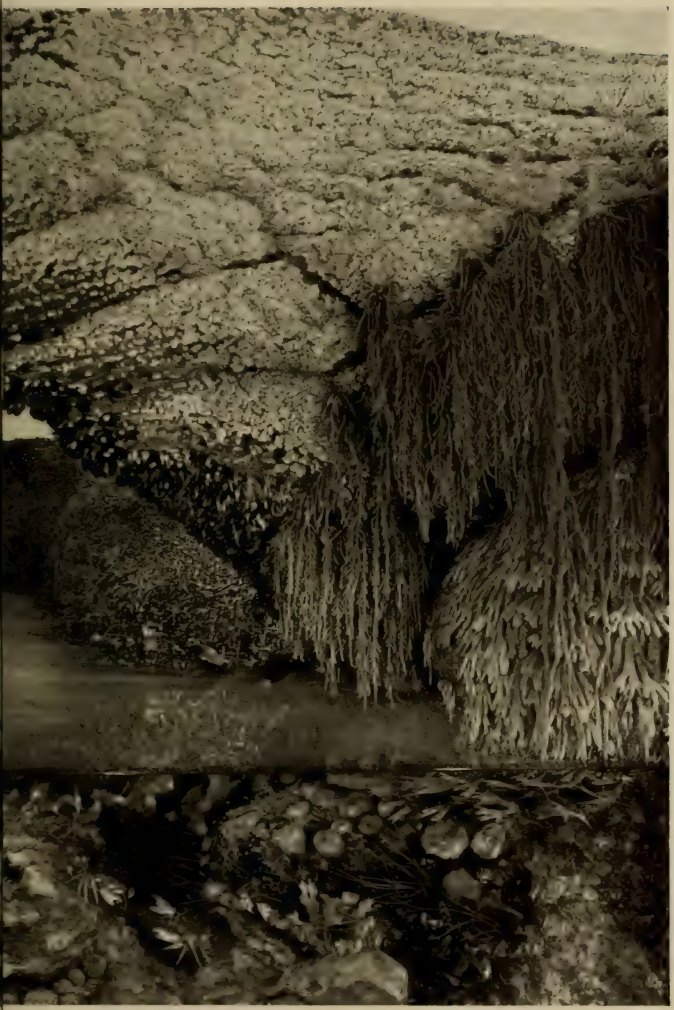
WINDOW GROUPS

In several of the alcove windows are habitat groups of invertebrates illustrating the natural history of the commoner and more typical, and showing how the kinds or species of animals found in any locality vary with the character of the bottom or of the surroundings.

In the Annulate Alcove is shown the Marine Worm Group, reproducing these animals with their associates in their natural surroundings, as seen in the harbor of Woods Hole, Mass. In the foreground the shallow water of the harbor near the shore is represented in section to expose the animal life found on muddy bottoms among the eel-grass, as well as the chimneys of various worm-burrows. In the lower part of the group a section of the sea bottom exposes the worms within the burrows. Several species of these are represented.

Marine Worm Group

A TYPICAL ROCK TIDE-POOL ON
Represented by a



RTH SHORE OF NEW ENGLAND
he Darwin Hall

Shore Mollusk Group

In the Mollusk Alcove window is shown the natural history of a sand-spit at Cold Spring Harbor, Long Island, including some of the shore mollusks and their associates. In the foreground at the edge of the sand-spit a mussel-bed is exposed by the receding tide over which fiddler crabs are swarming into their burrows. Beneath the water surface an oyster is being attacked by a starfish, while crabs and mollusks of various species are pursuing their usual activities.

Wharf Pile Group

The window group in the Vertebrate Alcove shows the submerged piles of an old wharf at Vineyard Haven, Mass., covered with flower-like colonies of stationary animals. Among these are sea-anemones, tube-building worms, hydroids, mussels, sea-mats and several kinds of ascidians or sea-squirts. The latter are primitive members of the Chordate group which includes the vertebrates.

Rock Tide-Pool Group

In the southeast corner of the hall, a window group shows the animals and plants of a rock tide-pool, the "Agassiz Cave," at Nahant, Mass. The falling tide has left a pool in a rocky basin, sheltered within which is a community of sea-anemones, sea-stars, corals, sponges, hydroids and other animals living in the midst of a gorgeous sea-garden of marine plants such as are common on the northern New England coast. Through the arch of the natural bridge may be seen a curious rock formation known as "Pulpit Rock."

Sound Bottom Group

At the end of the Arthropod Alcove, a group shows an incident in the struggle for existence among Crustacea in their natural surroundings on the sandy bottom of Vineyard Sound, Massachusetts. Here is a den of lobsters in a crevice beneath the seaweed-covered granite boulders forming the reef known as the Devil's Bridge. In the sand near by the Lady Crabs are accustomed to burrow to escape their lobster enemies. An unwary crab has ventured out to hunt for shrimp and is immediately pounced upon by one of the vigilant and voracious lobsters.

Bryozoa Group

Another group represents two square inches of sea bottom as though enlarged under a microscope to an area four feet square. The front of the case is built to represent a huge magnifying glass, through which the visitor sees marine plants magnified to tree-like proportions, encrusted with colonies of bryozoa or "sea-mats," composed of thousands of individuals, each of which builds a "house" or shell of graceful, vase-like form; hydroids, giving rise to tiny "medusæ" or jelly-fish; and even protozoa are brought within the range of vision. Associated animals, such as the flower-like, tube-building worms and sea spiders, are enlarged to grotesque proportions. This group illus-

FLOWER-LIKE ROTIFERS SETTLED IN A NOOK AMONG THE WATER PLANTS

A Detail from the Rotifer Group

trates well the prolific and varied jungle worlds, found even in the smallest areas of the sea-bottom, the existence of which, because of their microscopic size, is not suspected by casual observers.

Rotifer Group

A companion exhibit represents a cubic half-inch of a fresh-water pond bottom enlarged one hundred diameters or cubically a million times, thus transforming a minute area into a towering aquatic forest peopled by myriads of strange creatures ordinarily invisible to the naked eye. The group centers about a spray of bladderwort which is provided with bladder-shaped animal traps for the capture of the microscopic rotifers, protozoans, water fleas and insect larvæ upon which this strange carnivorous plant feeds. The living creatures most abundantly represented in the group are the rotifers, top-shaped animals with vibrating crowns of hair-like cilia which move in such a fashion as to give the impression of a rotating wheel, hence the animals are often called "wheel-animalcules." Many rotifers are free-swimming, while others remain stationary and build clusters of beautiful vase-shaped "houses" from the openings of which are protruded their flower-like heads.

BIOLOGIC EXHIBITS

Variation Under Domestication

Other exhibits illustrate certain facts made clear by Darwin and those who came after him. On the left facing the entrance, variation under domestication is illustrated by dogs, pigeons, and domesticated fowls, the wild species from which they have been derived being shown in company with some of the more striking breeds derived from them.

Variation in Nature

On the right, several exhibits will show variation in nature. An example of this is the variation among the finches of the genus *Geospiza* in the Galapagos Islands.

Other examples show by means of a series of mollusks the range of color variation within a single species of West Indian Sun Shell, variation of sculpture within a single genus of land snail, and variations about the normal type of the common scallop.

Struggle for Existence

The struggle for existence is portrayed by the meadow mouse, surrounded by its many enemies and yet continuing to maintain an existence by virtue of its great birth-rate.

Heredity

The simpler features of the laws of Heredity as elucidated by Mendel and his followers are illustrated by the inheritance of seed-coat color in the common pea, the color of sweet peas, and the coat-color of rats.

THE STRUGGLE FOR EXISTENCE AT THE SEA BOTTOM

An unwary lady crab (*Ovalipes ocellatus*) has ventured out of the sand, where it usually lies buried up to its projecting eyes and feelers, and is immediately pounced upon by a lurking lobster. The crab frantically endeavors to escape by vigorously paddling its oar-shaped hind limbs. A detail from the Sound Bottom Group.

Models of the Malaria Mosquito

Here also four large models show the mosquito, which is the active agent in the spread of malaria, and stages in its development enlarged seventy-five diameters or in volume four hundred thousand times the natural size.

The associations of marine life found in the Bahamas are represented by several small groups in the center of the hall.

East Wing

HALL OF FISHES

The Sea Rovers

On entering the Hall of Fishes one faces a group of sharks, sweeping down upon a helpless loggerhead turtle. The large decorative panel on the right illustrates the principal grand divisions of fish life and their history in geologic time. The decorative panel at the left represents successive stages in the development of the Austra-

lian Lungfish, *Neoceratodus forsteri*, from the fertilized egg to the adult.

Systematic Exhibit

The Systematic Exhibit includes a representative series of fishes from the lowly "cartilage fishes," including the sharks and rays, to the highest or most complexly constructed bony fishes. Noteworthy in this series are the "Fishes with Limbs and Lungs," the terrible hag fishes, the graceful skates and rays, the hammerhead shark, and the thresher shark. Then follow a series of mounted groups of "ganoids," including the sturgeons, spoonbills, bony gars, bowfins, all of exceptional scientific interest, since they are "living fossils," or descendants of the now fossil fishes of earlier geologic times. In the alcoves and wall cases on the right, or east side, the visitor will find many curious forms, such as the giant catfishes, the handsome rooster fish, the brilliant parrot wrasses, and butterfly fishes.

Big Game Fishes

At the north end of the Fish Hall is the exhibit of Big Game Fishes, including many of great size taken with rod and line by Zane Grey. The huge ocean sunfish, caught by him with harpoon and gaff, weighed nearly a ton. The centerpiece of the exhibit is the mounted sailfish, shown in the act of leaping from the water in a desperate effort to shake the hook from its jaws.

The walls of the inner enclosure represent tropical reef waters; against them in the center hangs the giant Manta, or Devilfish, measuring 17 feet, 3 inches across the "wings." Over the small inner doorway is mounted a model of the rare Oarfish, and on either side are various pictures and specimens taken on the "Arcturus" Expedition of 1925.

The Deep Sea Fishes

The Deep Sea Fishes form a special exhibit in an inner room. Here in the semi-darkness we view some of the hobgoblins of the ocean depths—many of them covered with jewels of phosphorescent light.

Biological Exhibit

On either side of the entrance to the inner enclosure is the Biological Exhibit. One case considers the fish as a machine: its stream-line form; its main principles of construction; its locomotor machinery, and the mechanism of its jaws. Another case considers the fish as a living organism: how it grows from a single fertilized egg; interesting cases of nest building; parental care of the young, and allied topics.

THE COUNTRY OF PERPETUAL NIGHT

From Group in the Hall of Fishes

Southeast Court

HALL OF OCEAN LIFE

Opening from the Hall of Fishes is the *Hall of Ocean Life*, now in preparation, wherein will be displayed whales, porpoises, seals and other marine animals, including shells.

Also in this hall, six large habitat groups of African Mammals are being installed, pending completion of the African Hall.

Suspended on the right and left are models of the fierce Killer and the stupid Blackfish. Farther to the right the skeleton of a big Sperm

Whales and Porpoises

Whale, sixty-five feet long, and above it the reproduction of a giant squid, which forms an important part of the food of this whale, also his nearest relative, the little Kogia, which is not as long as a baby sperm whale. A cast of a young Sperm Whale that wandered into New York harbor and was captured in the Gowanus Canal, hangs nearby.

Above the cases is a frieze representing marine scenes, which serves as a background for groups of porpoises and dolphins.

The collection of shells, containing about 150,000 specimens, representing nearly 20,000 species, is one of the finest on public exhibition.

Shells

The specimens are selected for their unusual size and perfection and show an extraordinary range of color and ornamentation. The arrangement is as follows:

Immediately facing the entrance is a huge shell of the Giant Clam, *Tridacna*, measuring 43 by 27 inches, and weighing 579 pounds, one of the largest examples on record. Hanging from the ceiling is a life-size model of the Giant Squid, a huge cephalopod mollusk found in the deeper waters of the ocean. This species is said to do battle with the sperm whale, and fragments of its jaws and tentacles have often been found in the stomach of that great sea mammal.

On the right-hand side of the entrance, a wall case contains selected shells from the recently acquired Constable Collection. On the left-hand side a similar case is filled with specimens selected for their unusual size and beauty, from the Steward and other collections. Otherwise the wall cases contain the bivalves, or mollusks which have two shells, like the common clam, while the A-shaped cases are devoted to the sea snails or univalves, so called because they have but one valve or shell. The large table cases at the two ends of the hall hold the land shells. In the northeast corner, a series of specimens and colored photographs illustrates the pearl button industry of the United States.

Short descriptive group labels will be found in the cases, together with picture labels of important families of shells. The cases which exhibit shells of especial beauty are those holding the genera *Murex*, *Fusus*, *Pecten*, *Spondylus*, *Voluta*, *Conus*, *Oliva*, *Strombus* and *Cypræa*.

The large skeleton at the end of the hall is of a Right Whale, so called because it was the right whale to get instead of the fin-back and others, which lacked the commercial value of the Right Whale. This whale, once common off the coast of Long Island, has been commercially, perhaps completely, exterminated in the North Atlantic.

At the very end is the Narwhal, whose long tusks formerly did duty as the horn of the fictitious Unicorn. On the left are the skeletons of a

STELLER'S SEA LION

The most striking figure in the Sea Lion Group, Hall of Ocean Life

sixty-five foot Finback Whale and of a California Gray Whale, and nearer the railing a series of reproductions of the small cetaceans known as porpoises, among them the Bottle Nose Porpoise and common Dolphin, the species most often seen by travelers.

Under the gallery are the first of a series of groups of marine mammals, the Elephant Seal, Fur Seal, and Sea Lion, the last including some unusually large and fine examples of this animal.

At the end of the Hall is being assembled a reproduction of a section of a coral reef with its varied and colorful life.

Return to the South Pavilion (Memorial Hall.)

Totem pole at Wrangel, Alaska. At the bottom is a beaver with a frog under his chin; above is a raven; and above the raven a frog, which is surmounted by a human head.

South Central Wing

INDIANS OF THE NORTH PACIFIC COAST

Haida Canoe

As the visitor passes through Memorial Hall he sees directly behind the Jesup statue a large canoe filled with a group of men. This stands in the entrance of a hall devoted to the Indians of the Northwest Coast. They are especially noted for their totem poles, grotesquely carved and painted. A double row of these lines either side of the central aisle and others are on the side walls. These carvings fall into three main classes: totem poles proper which in some cases were sixty feet high, towering over the villages; house posts, four of which were the main supports of the house roofs; and grave monuments taking various forms.

In the center aisle will be found a model of a Kwakiutl village showing the type of construction of the house and the arrangement of the houses in the village, and an industrial group illustrating the household activities of the men and women.

On the walls are murals done by Will S. Taylor which illustrate both the industrial and the social and religious life of the Indians of this region.

The exhibits are arranged in the same order in which the tribes are encountered in passing from the south toward the north along the coast of British Columbia and Alaska.

On the left are the collections from the Nootka living on the west coast of Vancouver Island. They are noted as hunters of whales, a hazardous occupation, especially when done without the aid of large boats. Next are the Kwakiutl, who live in the northern portion of Vancouver Island, subsisting mainly on fish and the smaller sea mammals. The devices for taking fish vary not only for each kind of fish, but in the case of salmon they are also especially adapted to the particular location in which the fish are taken. The Kwakiutl formerly devoted much of the winter

Copyright

WEAVING A CHILKAT BLANKET

A mural painting by Will S. Taylor.

to dramatic ceremonies in which grotesque masks were worn. Examples of these will be found near the middle of the west side of the hall.

At the farther end the art of the Tlingit Indians of Alaska is shown in considerable detail. They are especially expert in carving in stone, bone, ivory and wood. One of the tribes of the Tlingit, the Chilkat, make blankets from the wool of the mountain goat. The end wall case is entirely devoted to the basketry of the Tlingit.

The wall case directly opposite contains carved and painted boxes and chests selected to illustrate this phase of Northwest Coast art. Passing down the east side of the hall the following peoples are represented: Haida, Tsimshian, Bella Coola, Coast Salish, Shuswap and Thompson. The two last mentioned are not Northwest Coast in culture. They live in the interior of British Columbia. Their baskets are of especial interest.

North Corridor

The Eskimo

The Eskimo collections will be found in the adjoining hallway and corridor. Near the entrance is an Eskimo woman fishing through the ice. She has formed a windbreak with blocks of ice. The fish rod and hook and the long ladle are made of bone and with this latter she keeps the water in the hole from freezing over while she is fishing. Just back of her stands a man about to strike a seal under the ice. In another case will be found an Eskimo woman cooking in the interior of a snow hut or igloo lined with sealskin. She is using a stone lamp filled with seal oil, which feeds the flame over which the meal is being prepared. In this section will be found collections, obtained by the Stefansson-Anderson expedition, from the Eskimo of Coronation Gulf, some of whom had never seen a white man. In other cases are shown the clothing of the Eskimo, the many ingeniously made implements, and many finely carved and engraved ivory objects from the collections made by Peary, Comer and MacMillan.

Building Stones

The farther portion of the corridor is occupied by the collection of building stones; a series of rocks illustrating the geology of Manhattan Island, and some large specimens of interest in general geology.

Meteorites

The center of the corridor is occupied by the general collection of meteorites, one of the largest and most representative in this country, containing specimens from about 500 of the 700 falls and finds that are known throughout the world.

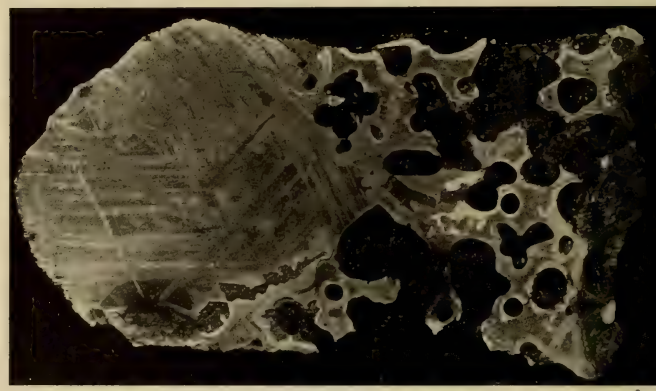
Some of the principal features of our collection are: 2000 or more individual masses from the stone shower which occurred when a large meteorite exploded near Holbrook, Arizona, in 1912: these have been arranged in a case by themselves to illustrate a concentration of the shower.

The entire mass of "Ysleta," an iron meteorite weighing 310 pounds which was found near the ancient village of Ysleta, New Mexico, in 1914.

The largest mass, 20 pounds in weight, of the stone meteorite which exploded and fell near Richardton, North Dakota, June 10, 1918.

The largest mass, about 5 pounds in weight, of the stone meteorite, which burst and fell near Cumberland Falls, Kentucky, April 9, 1919.

A series of polished and large etched slices of iron meteorites, including an entire section of the Mt. Edith, Australia, mass, showing the Widmanstätten lines in great perfection, and polished slabs from several large stone meteorites: these are in a case by themselves which likewise contains several comparatively large entire single masses of some famous falls.



THE STRUCTURE OF METEORITES

A section of Brenham, siderite (nickel iron) on the left, passing into siderolite (iron and stone) on the right. Note the broad Widmanstätten lines

Auditorium

The *Auditorium*, opening from the corridor, has a seating capacity of 1500, and is equipped with two screens, 25 feet square, for stereopticons and motion pictures. Here are given lectures to Members of the Museum; to the Children of Members; to teachers and pupils of the public schools, to students of the high and training schools, and to the public.

West Central Wing

Present heating and lighting plant.

Return to Jesup Statue, Memorial Hall, South Pavilion.

West Corridor

ASTRONOMY

Directly adjoining Memorial Hall on the west, or left, is the Pro-Astronomic Hall containing among other exhibits the paintings by Howard Russell Butler of the eclipses of 1918, 1923 and 1925, and striking illustrations of the solar prominences of 1895, 1918, 1919, and 1920.

In the corridor, near the Pro-Astronomic Hall, is a case of rare astronomical instruments, sundials, compasses, etc. In the same corridor may be found oil paintings of the Aurora Borealis, the work of Mr. Leonard M. Davis.

SOUTHWEST WING

INDIANS OF THE WOODLANDS

Opening from the west corridor are three halls containing collections from the North American Indians, which, together with the hall in the south central wing, present the nine great culture areas of North America. (See map at the right of the entrance.)

The hall you now enter represents three of these culture areas. Filling the greater part of the hall are the tribes of the Eastern Woodlands who occupied the middle portion of the North American continent east of the Mississippi. In the first of two wall cases is a comparative exhibit in miniature of the houses, methods of cooking, transportation, and dress of the various tribes of North America. Midway of the hall on the right side are represented the peoples of the Southeast.

Near the entrance of the hall will be found relics of our local Indians. On the left are some specimens of pottery vessels and many small objects of stone and bone recovered from the Island of Manhattan and the neighboring territory of Staten Island, Long Island and Westchester County. Nearby on the same side of the hall are collections obtained from living Indians of the coast region north and south of New York. These are the Penobscot and Passamaquoddy of Maine, the Micmac and Malecite of the lower provinces of Canada, and a few but rare objects from the Delaware who once occupied the vicinity of New York City and the State of New Jersey. The age and historical relations of these cultures are shown in a large label at the left of the entrance.

A family group of Micmac Indians, in a birch bark wigwam, is shown half way down the hall.

On the opposite, north side, are the Iroquois, whose league comprised the Mohawk, Seneca, Oneida, Onondaga, Cayuga, and later the Tuscarora. They dominated New York and much adjoining territory. The exhibits represent particularly the agriculture of the East, which was carried on with rude tools by the women.

In a case in the aisle are exhibited wampum belts which were highly esteemed in this region. They served as credentials for messengers and as records of treaties and other important events. Later, wampum beads came to have a definite value as currency, especially in trade between the white men and the Indians.

In the farther end of the hall, on the left, are the collections from the Ojibway, Hiawatha's people, who lived mainly north of the Great Lakes. They had but little agriculture, living chiefly by hunting and

AN IROQUOIS WARRIOR
From the group in the Woodland Indian Hall.

fishing. Beyond the Ojibway are the Cree, who lived still farther north. Here is to be seen the rabbit skin clothing of our childhood rhymes.

Opposite the Ojibway are the great Central Algonkian tribes, the Menomini and Sauk and Fox, who lived south and west of the Great Lakes. They gathered wild rice and hunted and fished, practising also

some agriculture. In one of the Menomini cases are some skin bags beautifully worked in porcupine quills. These bags were used in the Midéwin, the secret society of the shamans. Visitors interested in the designing art will find the cases of this hall full of bead, quill and textile designs of a high order. (See *Guide Leaflets*, Nos. 41, 50, 63, "Indians of Manhattan," "Indian Bead Work" and "Indian Costumes.")

The dwellings are of several forms, among which may be mentioned the long rectangular houses of the Iroquois covered with oak bark; the dome-shaped huts of Long Island and vicinity which were covered with mats and bundles of grass, and the familiar conical wigwam of the Ojibway covered with birchbark. The utensils are of pottery, wood or birchbark. Pottery was not made by all the Eastern tribes and seems to be associated with the practice of agriculture. The designs are incised, never painted. Bowls, trays, and spoons are made of wood and often decorated with animal carvings. The use of birchbark in the construction of light, portable household vessels is a particular trait of our Eastern Indians.

In the southeastern portion of the United States, agriculture was highly developed. These tribes are represented by the Cherokee and Yuchi, who made pottery, and by the Choctaw and Chitimacha, who made interesting baskets of cane. The Seminole of Florida have maintained an independent existence in the Everglades for nearly a century. Their picturesque costumes are shown. Their prehistoric arts are illustrated in the table case; they excelled in polishing stones and working shell.

Southwest Pavilion

INDIANS OF THE PLAINS

The collections from the Indians of the Plains will be found in the hall adjoining. These Indians comprised the tribes living west of the Mississippi and east of the Rocky Mountains as far south as the valley of the Rio Grande and as far north as the Saskatchewan. (See map on south wall.)

On the left side of the entrance, against the wall, is a special exhibit of life casts and photographs of typical Plains Indians, with tables and charts explaining their chief racial characteristics.

Occupying the greater part of the hall, beginning on the left, are the buffalo-hunting tribes: the Plains-Cree, Dakota, Crow, Blackfoot, Gros Ventre, Arapaho and Cheyenne. These tribes did not practise agriculture but depended almost entirely on the buffalo; buffalo flesh was their chief food, and of buffalo skin they made their garments. In some cases a buffalo paunch was used for cooking, and buffalo horns were made into various implements of industry and war. The spirit of the

A DANCER OF THE DOG SOCIETY
Arapaho Indian

buffalo was considered a powerful ally and invoked to cure sickness, to ward off evil, and to give aid in the hunt. Whenever the buffalo herds led the way, the more nomadic Plains tribes moved their tents and followed. With the extermination of the buffalo the entire life of the Plains Indians was revolutionized.

On the right, near the entrance, are the village tribes of the Plains; the Mandan, with whom Lewis and Clark passed the winter of 1804–1805, the Hidatsa who now live with them, and the Omaha, Kansas, Iowa and Pawnee. All these tribes raised corn and lived in earth-covered

houses of considerable size. A small model of one of these houses stands near the exhibits.

Blackfoot Tipi

In the center of this hall is a Blackfoot Indian tipi with paintings of otters on the sides, representing a vision of the owner. This tipi has been fitted up to show the home life of a typical buffalo-hunting Indian.

A DOG FEAST OF THE SIOUX

Given in honor of Mr. Sanford (the Indian agent), Pierre Choteau, K. McKenzie and Mr. Catlin. From the Catlin Collection of paintings.

SOUTHWEST TOWER

The Blackfoot collections extend into the tower, in which a general collection of quill and bead work is also shown.

Societies

There were numerous soldier societies among the Plains Indians which included practically all the adult males. Each society had a special dance and special costumes. (See the Arapaho cases for costume dances.) There were other dances connected with tribal religious ceremonials, the best known and most important of which is the Sun Dance, illustrated by a model at the left of the tipi. The Sun Dance was held annually in the early summer in fulfilment of a vow made during the preceding winter by some member of the tribe who wished a sick relative to recover. The dance involved self-torture, great physical endurance and a fast lasting three days.

Sun Dance

In the center of the hall is a genuine medicine pipe, held in awe by the Indians and dearly parted with; also the contents of a medicine-pipe bundle. The contents of another medicine bundle, belonging to a leading man of the Blackfoot tribe (medicine-man), together with the headdress which he wore in ceremonies, are in a case near the tower. Other remarkable bundles, particularly the skull bundle, are in the Pawnee case, on the north wall.

Medicine Pipe

The Plains Indians are noted for their picture-writing on skins and for their quillwork, which has now been superseded by beadwork. They have a highly developed decorative art in which simple geometric designs are the elements of composition, this being one of the most interesting features of their art. (See Dakota case and *Guide Leaflet* No. 50, also *Handbook* No. 1, North American Indians of the Plains.)

West Wing

INDIANS OF THE SOUTHWEST

On the left are collections from the sedentary Indians who occupy the pueblos of the Rio Grande and of Hopi, Acoma and Zuñi; and also the objects recovered from the prehistoric pueblos, caves and cliff-dwellings. On the right are the nomadic Indians —the Eastern and Western Apache, the Navajo, the Pima and the Papago.

Pueblo Indians

The sedentary Indians live in large community houses, often with several receding stories, built of stone or adobe. They depend chiefly upon agriculture for their food, make a great variety of pottery, and have many elaborate religious ceremonies. The nomadic peoples live in tipis or small brush and thatched houses which are moved or deserted when they are forced to seek the wild game and wild vegetable products which furnish much of their food. They make baskets for household purposes which are more easily transported than vessels of clay. In the hall are models of the pueblos of Taos and Acoma, of prehistoric cliff-dwellings, and of the houses used by the Navajo. In the first alcove on the left are shown the pottery of the villages along the Rio Grande, the principal art of the region, skin clothing, household utensils and ceremonial objects.

The upright cases of the next alcove are filled with wonderful prehistoric pottery. That in the wall case is from Pueblo Bonito. Similar black and white ware with very elaborate and splendidly executed designs, in an adjoining case, is from Rio Tularosa, one of the upper tributaries of the Gila, where a vanished agricultural people once lived in pueblos and cliff-dwellings. A third case has material gathered by the Museum expedition which explored Galisteo Valley, New Mexico.

In the table case and in a case standing in the aisle is shown the wonderful art work in turquoise, shell, stone and wood of the former inhabitants of Chaco Cañon. These objects, as well as the pottery from Pueblo Bonito mentioned above, were secured by the Hyde expedition.

In the next alcove, devoted to the Hopi, are the costumes, masks, images, and plaques used in their ceremonies. Besides the well-known Snake Dance, the various Hopi villages have many interesting ceremonies, a number of which are concerned with the rainfall and the crops.

In the large wall case and in the table case of the next alcove will be found pottery, objects of stone, shell and wood from the Aztec ruin. This collection was secured during the excavations of the ruin continuing from 1916 to 1921. A model to scale of the ruin itself will be found in the center of the main aisle. The northern upright case of this alcove contains objects from Utah illustrating the life of the earliest known people of the Southwest, the Basket Makers.

The inhabitants of Zuñi are believed to be the descendants of the first people seen by the Spanish in 1540. Their former villages, many of which now are in ruins, were probably the "Seven Cities of Cibola," for which Coronado was searching at that time. Although they had missionaries among them for about three centuries, they have retained many of their own religious ceremonies. Many objects pertaining to these ceremonies as well as to everyday life are shown in this alcove. In the last case on this side of the hall are examples of Zuñi and Acoma pottery.

At the north end of the hall opposite the Zuñi, space is given to an exhibit from the tribes of California. In the large end wall case the baskets of the region are arranged so as to show the various types.

Pima and Papago

The Pima, east side of the hall, practised irrigation, raising by its aid the corn and beans on which they relied for food and the cotton which they used for their scanty garments. The Papago, with whom they are closely associated, occupied the more arid portions of southern Arizona and northern Sonora, securing their living from such desert products as the giant cactus, the century plant, the yucca and the mesquite, and small game. Examples of their food, basketry, pottery, and ceremonial articles are shown.

From the aisle near the Pima-Papago section, one catches a glimpse of the home of the Hopi. This large group represents the First Mesa with the village of Walpi. The canvas was painted by Howard McCormick and the figures were modeled by Mahonri Young.

Navajo

The Navajo, a large and widely scattered tribe, inhabit much of the country drained by the San Juan and Little Colorado rivers. During the winter they occupy log houses, but in milder weather camp with the slight shelter of a cliff or a windbreak and shade made of brush. They live by raising corn in the moist valleys, and on the flesh of their numerous flocks of sheep.

NAVAJO BLANKET

From the Museum's valuable collection. The Navajo Indians of the Southwest are a wealthy, pastoral people, and the best Indian blanket makers of North America.

They are the present-day blanket makers of North America. They make use of the wool of the sheep they raise, carding, spinning and weaving it by means of the simplest implements and looms. This art is believed to have arisen since the coming of the Spanish and it is known to have passed through several stages in the last sixty years. The older types of blankets here shown contain yarn which was obtained by cutting or raveling from imported flannels, called in Spanish "bayeta," from which the blankets of this sort receive their name. These are either bright red or old rose in color, resulting from cochineal dye. Several

THE APACHE GROUP

The scene is laid in the valley of the San Carlos River, Arizona; the time is summer, and the Indians are shown engaged in the ordinary pursuits of daily life.

blankets are made of yarn bought ready dyed from the traders and are called Germantowns. The greater number, however, contain yarn of native spinning, dyed with native vegetable and mineral dyes.

The Navajo are also expert silversmiths. Their tools and samples of workmanship are displayed in a case in the center of the hall.

The large group in the middle of this side of the hall represents the Navajo ceremony of the Night Chant. Men wearing masks and dressed as gods are seen in the center. In the foreground is a family waiting for the cooking of a meal. The background gives a view of Cañon de Chelly, Arizona, in a cave in the walls of which White House, a well known ruin, is seen.

Apache

The Western Apache live along the upper portion of the Gila and Salt rivers, where they practise agriculture, gather the wild products and hunt. People, related to these, under Geronimo, raided the settlements of southern Arizona and northern Mexico and evaded our troops for years. They live in grass-thatched houses or in the open under the shade of flat-topped, open-sided shelters. In an adjoining alcove is an industrial group with painted background showing the well-watered San Carlos valley occupied by the Apache for many generations. It is shown on page 48.

The Eastern Apache lived in buffalo-skin tipis. They went far out on the plains in search of the buffalo herds, avoiding, if possible, the plains tribes, but fighting them with vigor when necessary. In dress and outward life they resemble the Plains Indians, but in their myths and ceremonies they are like their southwestern relatives and neighbors. The baskets of the Apache are shown in the large end case, which is in contrast with the corresponding case of pottery on the other side of the hall. Not the environment, but social habits, caused one people to develop pottery and the other to make the easily transported and not easily breakable baskets. (See *Handbook* No. 2, Indians of the Southwest.)

Return to the West Corridor.

Adjoining the West Corridor is the Bickmore Memorial Corridor, named in honor of Prof. Albert S. Bickmore who inaugurated the work of the Museum with the schools. This leads to the School Service Wing which contains the exhibits, offices and classrooms of the Department of Education.

SOUTHWEST COURT

SCHOOL SERVICE BUILDING

EDUCATION AND PUBLIC HEALTH

The department of Education is concerned directly with work with the public schools of New York City through its loan collections of lantern slides and objects of natural history and through illustrated lectures given at the Museum and at certain of the public schools.

The department occupies the School Service Section, a five story structure completed in 1926.

On the first floor is Education Hall, containing the exhibits of Public Health. This hall is used also for important temporary exhibits and special gatherings.

The second floor contains a main lecture hall, seating five hundred, which can be divided into smaller halls, and there are class rooms, a model school nature room, and a special room for the blind.

On the third floor are offices for the staff, the slide-circulating department, a display of the collections available for loans, the teachers reference library, and consultation room.

The extent of the work of the department is shown by the summary of that for 1929, page 14.

FIRST FLOOR

EDUCATION HALL

On the north side will be found the exhibits of Food and Public Health.

FOOD NEEDS AND FOOD ECONOMICS

Scope of Food Exhibit

Commencing at the east, the Food Exhibit presents in graphic form the needs of the human body and shows how these needs can most economically be met. The first case on the right shows the chemical composition of the human body as represented by a man weighing 154 pounds. Special emphasis is laid on the need for mineral salts and for the indispensable elements called vitamins, and models illustrate the contribution made by the commoner foods to the daily need of energy, protein, iron, calcium and phosphorus.

The composition of certain common foods as regards protein, carbohydrates, fat, mineral salts, water and refuse, is graphically illustrated. A special series of models shows the size of 100 caolrie portions of the more important foodstuffs, classified by costs.

One case is devoted to the problems of the world's food supply, its production and distribution. The importance of the rice, wheat and other grain crops is emphasized and the relation of cereal production to national prosperity is brought out by models and diagrams. Special data are planned in regard to the cost of food distribution, particularly as related to New York City, with suggestions as to the art of economical marketing.

World Problem of Food Supply

In order to make the exhibit as practical as possible, an adequate daily dietary for an individual is exhibited, based on a moderate income, also specimens and models illustrating a complete weekly food supply for a family of five persons, so adjusted as to meet all essential physiological needs at a minimum cost. Models illustrate the relative importance of the cost of food as a factor in the family budget. This is shown in the case opposite the last exhibit. In the reverse of this case is an exhibit showing types of green leaves valuable for food.

Practical Data for the Housewife

PUBLIC HEALTH

The balance of this northern section is filled with the exhibits of Public Health, which fall into three main divisions: Insects, Rats and Parasites and their Relation to Health; Water Supply; and Disposal of Sewage.

The first series of exhibits deals with the transmission of disease germs by insects, notably by the fly, by the flea and by the mosquito. The most striking features are greatly enlarged models of the fly, the flea, the louse and the yellow-fever mosquito, shown in a nearby case. Each of these, the finest model of the kind ever made, required a year or more of constant, exacting labor.

Insects and Disease

The first wall exhibit is divided into two parts. In the lower part a relief map of the State of Arkansas illustrates the coincidence between low swampy regions and the prevalence of malaria, and another shows the heavy incidence of malaria in the vicinity of marshlands near Boston. The scientific reason for the association of malaria with swampy regions is that the *Anopheles* mosquito, the carrier of the malarial parasite, breeds in such places. Above the relief map are charts of insects and the rat, together with colored drawings of fifteen of the principal species of flies found in eastern North America.

Mosquitoes and Malaria

The next wall case shows a group of the natural enemies of the fly: the cock, phebe, swift, the bat, spiders and centipedes, in characteristic surroundings as they may be seen on a New York State farm on a late August afternoon.

Models, specimens and charts, in the next case, deal with the life history of the fly, showing its various stages in their natural size and actual habitat, and illustrate the large numbers of flies which may breed in a single pound of manure and the enormous progeny which may spring from a single pair and their descendants during the breeding season.

The deadly work of the fly in carrying typhoid fever is illustrated by graphic presentations of typhoid statistics of the Spanish-American War and of the relation between flies and "summer disease" of children, as worked out by the Association for Improving the Condition of the Poor in New York City.

Various types of traps for larvæ and adult flies are shown, with models illustrating how fly-breeding may be prevented, how human

THE FLEA

One of the enlarged models made by the late Ignaz Matausch from his original studies and now shown in a case devoted to Insect Carriers of Disease.

wastes may be protected from their access, and how manure may be cared for so as not to be a medium for breeding flies.

Military Hygiene

A nearby case is devoted to the subject of military hygiene, which has become of such immediate moment and was, on the whole, so successfully solved during the Great War. Diagrams illustrate the relative deadliness of disease germs and bullets in earlier wars; and their lesson is reinforced by a representation of the relative importance of injuries received in action and of the results of typhoid fever during the Spanish War. One company, confronted by a cannon, suffers the loss of one man wounded, while the other, facing a tube of typhoid germs, has one dead and thirteen in the hospital. Other

THE FLY

models show how camp wastes are disposed of and how water supply is sterilized, and still others, how the soldier's tent is protected against mosquitoes and how a field hospital is equipped. The field ration of the soldier and the preparation of anti-typhoid vaccine are illustrated by specimens and models.

The Flea and Bubonic Plague

Wall charts (above) of pandemics, picture the spread of the great historic epidemics of the bubonic plague, and reproductions of sixteenth and seventeenth century drawings show with what terror the Black Death was regarded in pre-scientific days. The relation of the flea and the rat to the terrible bubonic pleague is also illustrated in considerable detail. Below are models showing how water supply, polluted with germs, may cause water-borne epidemics.

THE RAT

The Menace of the Rat

In the adjoining case and in the opposite floor cases are specimens of some of the principal animals which harbor the plague-germ and serve as reservoirs from which it is carried by the flea to man. The black, brown and roof rats, the wood rat and the California ground squirrel are shown, and the manner in which the disease is disseminated is illustrated by a copy of a corner of a rat-infested house in California. The original from which this was copied, as well as many of the rats and squirrels, were obtained through the courtesy of the U. S. Public Health Service of Washington. A habitat group shows a typical family of ground squirrels on a rocky hillside in central California, during the breeding season in May. Preventive measures used against the plague are illustrated in the next wall case, by models of a farm with buildings rat-proofed, of a rat-killing squad, equipped for work in San Francisco, of a ship at dock with rat-guards to prevent the access of rats to the shore, and by specimens of various types of rat-traps. Anti-plague vaccine is also shown.

MOSQUITOES AND TICKS

Control of Mosquito-borne Disease

In the adjoining wall case we see a series of small-scale models, attractively worked out by Otto Block, illustrating some of the methods and results of tropical sanitation as applied particularly to yellow fever, A hospital at Panama is shown as it was during the former régime, with mosquito-breeding pools all about and with the legs of the beds and the flower pots set in dishes of water to keep off the ants. In contrast there is illustrated a modern hospital with all stagnant water removed, and wards screened and ventilated. Other models show the sanitary squads on the Isthmus

which fought the yellow-fever mosquito in the town by fumigation, and the malaria mosquito in the country by ditching and oiling. Photographs of the four American army officers, Reed, Carroll, Lazear and Agramonte, to whose researches this advance is due, are hung upon the wall above the next exhibit.

A small relief map, in the lower part of the next exhibit, indicates the type and arrangements of drains used for lowering the water level and eliminating mosquito-bearing pools, and diagrams illustrate the progress made in mosquito control in New Jersey and the financial return which has resulted.

THE YELLOW FEVER MOSQUITO

Malaria and Yellow Fever

A second case, devoted to the natural history of the mosquito, illustrates the world distribution and seasonal prevalence of malaria and yellow fever in relation to the habits of their mosquito hosts, the breeding-places of mosquitoes, the life history (shown by specimens) and the money-cost of malaria to the United States. Here are also shown some of the practical methods of control by ditching, oiling, stocking with fish, and encouraging enemies such as the bat and certain aquatic insects. Successful repellents are also displayed.

Typhus and Sleeping Sickness

The next case is devoted to certain insect carriers of disease germs of special importance in tropical and semi-tropical countries. Scenes during the Serbian epidemic of typhus fever are illustrated by photographs and models of the disinfecting train used by the American Mission in the destruction of the lice which are responsible for the spread of this disease. Below are shown

specimens of the Glossinas which transmit sleeping sickness and the nagana disease in Africa and of the ticks which spread Texas fever of cattle, and relapsing fever, African tick fever and Rocky Mountain spotted fever of man. Photographs and models illustrate the ravages wrought by this disease and the methods used for the control of sleeping sickness in Africa by the cutting of the brush along the banks of swamps where the Glossinas breed, by the destruction of infected villages and the isolation of infected persons in concentration camps.

Near by is a floor case containing two contrasted models, showing unsanitary and sanitary conditions on a small farm. In one, pools of stagnant water and uncovered manure heaps and general uncleanliness favor the breeding of mosquitoes and flies, while the open doors and windows give these insects free access to the house. In the other, the swampy land is drained and cultivated, the windows screened, the shallow-dug well replaced by a driven well; the conditions are sanitary, and health and prosperity replace sickness and poverty.

SEWAGE DISPOSAL OF BACTERIA

Modern methods for the treatment of sewage on scientific lines are illustrated by a series of models of screens, sedimentation tanks, and filter beds of various types.

Bacteria and Parasites

Two separated wall cases are devoted to bacteria and parasites, especially in their relation to human life. In the first case, transparencies show some of the most important of these bacteria as they appear under the microscope. In the second case, glass models show the various shapes and relative sizes of these minute forms, and in particular of the principal types associated with disease.

Following is a large wall case showing some of the principal microorganisms, Algæ and Protozoa, which grow in reservoirs and impart tastes and odors to water, represented by a series of glass models. Samples and models here also illustrate the variations in composition which occur in natural waters, from the swamps of Virginia to the deep wells of Iowa and the turbid rivers of the Ohio Valley.

WATER SUPPLY

In the next case is a model to show how an artesian well, sunk through impervious rock, is supplied with water which has flowed underground along the rock strata from the place where it entered the ground a great distance away.

Diagrams, models and a relief map, in the last wall case, show the variations in rainfall at different points in the United States.

The final exhibit, on the western wall, deals with the natural history of water supply as it affects the life and health of man. The large painting illustrates the primary source of water supply, the sea, which by way of the clouds supplies the secondary sources: the rivers and lakes.

A series of relief maps on the wall shows the growth and development of the water supply of New York City, while a large floor model depicts accurately the location of the reservoirs and the aqueducts of the Ashokan Water System.

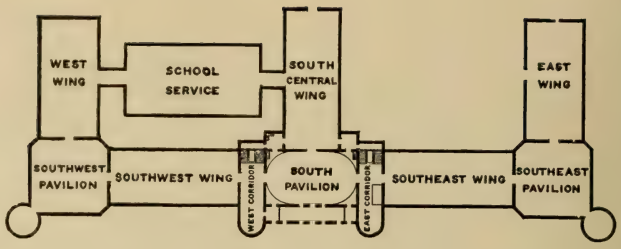
Returning toward the east, the next four cases contain models illustrating the purification of water by storage, filtration and disinfection, the filter models being elaborate representations of the plants at Little Falls, N. J., and Albany, N. Y.

Relief maps of the region about Clinton, Massachusetts, before and after the construction of the Wachusett Reservoir for the water supply of Boston, show the way in which surface water supplies are collected by impounding streams.

Following this water-supply exhibit is a model illustrating the dangers from improper disposal of the liquid wastes of the city and how they may be avoided. Actual points of danger in the neighborhood of New York are shown, where polluted harbor waters, bathing-places, and shellfish beds constitute a menace to health.

Disposal of City Wastes

Return to East Corridor (Elevators) and ascend to the Second Floor.



SECOND FLOOR

SOUTH PAVILION

BIRDS OF THE CONTINENTS HALL

This hall will be devoted to a series of twelve habitat groups designed to show the major faunal areas of the world and their characteristic birds. Two have been completed. One, based on studies made on Barro Colorado Island in the Canal Zone, presents the birds of a tropical American forest. The other, a scene from South Georgia Island, 1,200 miles east of Cape Horn, shows the bird life of the Antarctic.

Restaurant

Adjoining the Birds of the Continents Hall is the Restaurant, which is operated as a Museum department, under the efficient direction of a dietician-manager, and is open from 11 A.M. to 4:30 P.M. every day excepting Sunday.

Caribou Heads

On the main stairway (East Corridor) from the first floor to the third, is a magnificent series of antlers of the various American caribou.

SOUTHEAST WING

MAMMALS OF NORTH AMERICA

Continuing east beyond the elevator corridor, we enter the Allen Hall of North American Mammals. At the right of the entrance is a bronze tablet in memory of Dr. J. A. Allen who for thirty-six years was Curator of the Department of Mammals. About 1,500 kinds or species and subspecies of mammals have been described from North America, and the purpose of the exhibits is to show those that are peculiar to that region or characteristic of it, the more important, or more striking, being displayed in groups that tell something of their home life or of the region in which they live. The individual specimens give some idea of the variety of species found in North America; the smaller groups are devoted largely to the mammals that are, or were until recently, found within fifty miles of New York City.

ALLEN HALL OF NORTH AMERICAN MAMMALS

The first mammal to catch the eye is the Giant Moose of A'aska. Back of this is a group of Moose from New Brunswick, and beyond this the American Bison; these groups, mounted years ago, are still among the finest as well as the largest examples of their kind. See *Guide Leaflet*, No..53, "The Story of Museum Groups."

Moose, Bison

Immediately at the left of the entrance are the Grizzly and Alaska Brown Bears, the latter the largest members of the family. The larger groups in their order are the Virginia Deer, Timber Wolf, Beaver, Rocky Mountain Goat, Roosevelt Elk, Mountain Sheep, Polar Bear,

BISON COW AND CALF
A Characteristic North American Mammal

Puma, European Wild Boar, Musk-ox, and Pronghorn Antelope. The habitat groups proper show the animals in some characteristic occupation and, whenever possible, in a family group. The smaller groups, mostly shown in floor cases, include a number of species "found within fifty miles of New York." Among them are the Skunk and Opossum, Gray Fox and Brown Bat, Weasels, summer and winter pelage; Otter and Mink, Coney, and Say's Chipmunk, Pack Rat and Jack Rabbit, Red Fox, Woodchuck, Chipmunk and Flying Squirrel, Rabbit, Hare and Red Squirrel, Coyote and Wildcat.

Opossum and Skunk

The Opossum, noted for its cunning and tenacity of life, is the sole representative in the United States of the marsupials, or pouched mammals. The skunk is a useful, though much abused animal, now valuable for fur which is sold under the euphemistic name of Alaska Sable. While it occasionally destroys

THE WEASEL IN WINTER

One of the groups representing the small mammals found within fifty miles of New York City. The others of the series show opossum, red and gray foxes, skunk, mink, muskrat, woodchuck, rabbits and squirrels. The list includes some "fur-bearing" species; weasel fur is often used instead of ermine, and the muskrat has become one of the most important species.

poultry and other birds, its principal food consists of injurious insects and field mice. Its defensive weapon is an excessively fetid fluid secreted by a pair of glands situated near the base of the tail. It has the ability to eject this fluid to a considerable distance.

Virginia Deer

The Virginia, or White-tailed Deer, found over a large part of North America, is shown in its summer coat; other species of our deer are displayed in the adjoining cases and some beautiful albinos may be found in the hall above.

PRONGHORN ANTELOPE

This animal is peculiar to North America and is the only hollow-horned ruminant in which the horn sheaths are shed yearly.

ON THE TRAIL, TIMBER WOLVES IN COLORADO

Group designed by Hobart Nichols and executed under his direction.

Timber Wolf

One of the most beautiful and at the same time simplest groups in the Museum is that showing part of a pack of Timber Wolves following the tracks of deer. *See page* 63.

Muskrat

Opposite this is a group of Muskrats. Owing to its wide distribution, the rapidity with which it breeds, and the growing scarcity and increasing demand for furs, the muskrat has become one of the most important of fur-bearing animals, and its skins are sold literally by the million.

Cats, Wolves and Foxes

The cats, wolves and foxes, and the host of small creatures like bats, moles, squirrels, rats and mice, are represented by numerous characteristic examples. Here are the Jaguar, the largest of the American cats, the Puma, the well-known Coyote or Prairie Wolf and the little-known white Arctic Wolf from the extreme north of Greenland. Here too is the Arctic Fox in its two color phases, the valuable blue and the more common white, the one bringing as much as $140 for fur, the other worth only $12 to $60.

Beaver

The Beaver, formerly the most important, from a commercial standpoint, of North American mammals, and one intimately connected with the early history and exploration of the continent, is represented actively at work.

Roosevelt Elk and Mountain Sheep

At the end of this hall is a group of Roosevelt Elk found in the Coast Range from British Columbia to Northern California. Once abundant, they have become much reduced in numbers, though an effort is now being made to preserve them. On the opposite side of the hall are the Mountain Sheep or Bighorns.

Weasel, Otter and Mink

The Weasel, in summer and winter dress, the Otter and the Mink are three important fur-bearing anima's still found near the towns and cities. Weasel fur is often used in place of ermine.

Pronghorn Antelope

The handsome Pronghorn Antelope, peculiar to North America, once found in vast numbers on the western plains, is now verging on extinction.

Black Bear

A group in the center of the hall shows several color variations of the Black Bear. Among these are the Cinnamon Bear, the Glacier Bear, and Kermode's White Bear.

Peccary

The Peccary, one of two species related to the pig family and peculiar to America, is really an intruder from South America.

THE AMERICAN BEAVER

This shows the work and home life of the beaver. The old beavers are cutting trees for food and for building dams and houses. In the foreground is a house with part torn away to show the little beavers within. Beavers generally build their houses in the water, but where they are not molested they often construct them on land as shown here.

Several species of Caribou or Reindeer are shown: Grant's Caribou from western Alaska, the fine Woodland Caribou which inhabits Newfoundland, and Peary's Caribou, the smallest and northernmost of the group. Although fourteen species of caribou occur in North America, none has been domesticated, though the species brought from Siberia by our Government to furnish food and transportation has increased rapidly.

Caribou

VERNAY-FAUNTHORPE HALL OF SOUTH ASIATIC MAMMALS

Leaving the North American mammals, we pass east through the Southeast Pavilion, now partitioned off from the public while new exhibits of North Asiatic mammals are being constructed, into the new Vernay-Faunthorpe Hall of South Asiatic Mammals.

Here, in naturalistic settings of carefully selected accessories and beautifully painted backgrounds, all the greater game-mammals of southern Asia, as well as many of the smaller species, are on display.

This hall was formally opened on November 17, 1930, and a special guide to the hall will be published at an early date.

After viewing the splendid collection of mammals brought together by Mr. Arthur Stannard Vernay and the late Lt. Col. John Champion Faunthorpe, the visitor must retrace his steps through the Hall of North American Mammals to reach the Hall of Birds of the World.

South Central Wing

BIRDS OF THE WORLD

Going north we enter the hall containing the general collection of birds. The most striking feature is the exhibit of Birds in Flight, examples of such powerful fliers as the Condor, Eagle, Ducks, Geese, and others, as we would see them in nature flying overhead.

Systematic Collection

In the first four main cases on the right, the 13,000 known species of birds are represented by typical examples of the principal groups arranged according to what is believed to be their natural relationship. The series begins with the Ostriches, the "lowest" birds (that is, those

which seem to have changed least from their reptilian ancestors), and goes up to those which show the highest type of development, the Singing Perching Birds, such as our Thrushes and Finches. The remaining cases on the right wall and all of those on the left show the geographical distribution of the bird fauna of the world. The specimens are grouped according to the great faunal regions, the Antarctic, South American Temperate, American Tropical, North American Temperate, Arctic, Eurasian, Indo-Malayan, African and Australian realms. These cases, in connection with the accompanying maps, give opportunity for a comparative study of the birds of the different parts of the world. In each region, as in the Synoptic Collection, the birds are arranged in their natural groups to the best of our present knowledge.

LABRADOR DUCKS
From the Group showing these extinct birds

Extinct Birds

In the alcoves near the entrance are several cases containing birds which have become extinct or nearly so. The Labrador Duck, once a common visitor to our Long Island shores, became extinct for no known reason. The Great Auk and the Dodo were flightless species which bred in great numbers on small islands and were easily and quickly killed off by men. The Passenger Pigeon of North America lived by the million, in such dense flocks that vast numbers were slaughtered with ease, but the last individual died in captivity Sept. 1, 1914. The Heath Hen formerly had a wide range on our Atlantic seaboard, but as a game bird it was so continually persecuted, in and out of the breeding season, that it is now extinct. Specimens of all of

THE DODO

Restored from Old Dutch paintings. This gigantic pigeon was at one time abundant in Mauritius but it was quickly exterminated by early navigators.

these birds are shown here, the Dodo being represented by an incomplete skeleton and by a life-size reproduction copied from an old Dutch painting. Others of our splendid game birds, such as the Trumpeter Swan and Eskimo Curlew, are nearly, if not quite, gone, and more, like the Wood Duck and Wild Turkey, will soon follow them if a reasonably close season and limited bag be not rigidly enforced. Still others—the

THE PTARMIGAN IN WINTER

One of a series of groups showing the bird's seasonal changes of colors brought about by molting and feather growth.

beautiful Egrets and the Grebes, for example—have already gone far on the same road, owing to the great demand for the plumage for millinery.

In certain alcoves are several cases designed to illustrate the natural history of birds.

General Topics

The widely different plumages (varying with age, sex, season, or all three) often worn by one species, will be found illustrated in the Ptarmigan case and in the case containing Orchard Orioles, Snow Buntings, Scarlet Tanagers and Bobolinks. The relationship between structure and habits, the many forms of bill, feet, wings, tail, etc., and the different ways of using them are illustrated in other cases, particularly by one showing the feeding habits of some birds. Other cases show instances of albinism, hybridism and other abnormalities; the excessive individual variation in the Ruff; the birds of prey used by man in hunting; a few domesticated birds (an extensive collection of which will be found in Darwin Hall); the growth of the embryo and the structure of the adult bird; Archæopteryx, the oldest fossil bird; and a map-exhibit of migration.

At the west side of this hall is an entrance to the School Service

Building in which is the Nature Room maintained by the School Nature League. There are also class-rooms and exhibits used in connection with the Museum's School Service.

In the alcoves to the right the first egg case contains the Synoptic Collection of Eggs, which shows the variation in the number in a set, size, shell-texture, markings, shape, etc., and tells something of the laws governing these things.

Eggs

At the farther end of the hall is a collection of Birds of Paradise, presented by Mrs. Frank K. Sturgis. This family of birds, confined to New Guinea, Australia and some neighboring islands, though related to the crows, is noted for gorgeous plumes, wonderful as well in variety of form and position as in beauty.

Birds of Paradise

Return to the South Pavilion

THE AMERICAN ROBIN—FIRST OF THE GROUPS OF LOCAL BIRDS

West Corridor

LOCAL BIRDS

Adjoining the *South Pavilion* is the *West Corridor*, which contains the collections of local birds.

In this room are specimens of all the species of birds which have

been known to occur within fifty miles of New York City. As far as possible each species is shown in all its different plumages.

Seasonal Collection

In the wall case next the windows on the visitor's left is the Seasonal Collection containing the birds which may be expected to occur in this region during a part or the whole of the current month: in its left-hand two panels are the *permanent residents*, which are never changed, and in the right-hand two are the *migrants*, which are changed as necessary about the first of each month. In the next case on the left begins the *General Collection* of all birds found within this area, arranged according to the current American system of classification, beginning with the Grebes and continuing around the hall to end with the Thrushes by the southwest window.

Besides the table case containing the eggs (often with the nest) of species known to nest within fifty miles of the City, there is a series of groups of local breeding birds with their nests. These, the forerunners of our "Habitat Groups," were the first of their kind made for the Museum.

At the head of the stairs, on one side, is a map of the country within fifty miles; on the other, a case of *accidental visitors*—stragglers from other parts of the country and from other countries which have been taken within our limits.

At the other end of the room, between the windows, are exhibits which explain what is meant by a subspecies, and through what changes of plumage a bird passes from the time of hatching; also a bust of John Burroughs, by C. S. Pietro, the gift of Henry Ford.

Southwest Wing

ANTIQUITIES OF MEXICO AND CENTRAL AMERICA

Continuing west, past the collection of local birds, we enter the southwest wing, devoted to the ancient civilizations of Mexico and Central America. The visitor, in passing through this hall, will notice that the civilizations represented here are more or less similar to one another and have perhaps a New World common origin. They are quite different, however, from the civilizations of Egypt, Greece, or China.

Foremost of the peoples whose objects are exhibited in this hall were the Maya, of Honduras, Guatemala, and Yucatan. Examples of their sculpture will be found in the wall case at the right of the entrance. Casts of their monuments are ranged along the center of the hall. These are carved with inscriptions giving dates which can be read. In this way we learn that the Maya erected monuments as early as 98 B.C., and that

THE AZTEC GODDESS OF THE EARTH

The famous statue of the Aztec Goddess of the Earth called Coatlicue, "The Serpent-skirted One," is a striking example of barbaric imagination. It was found in Mexico City near the Cathedral in the year 1791. It doubtless occupied an important place in the great ceremonial center of Tenochtitlan, the Aztec capital, and probably dates from the last quarter of the 15th century.

The head, which is the same on front and back, is formed by two repulsive serpent heads meeting face to face. The feet are furnished with claws, but the arms, which are doubled up with the elbows close to the sides, end each in a serpent's head. The skirt is a writhing mass of braided rattlesnakes. The creature wears about the neck and hanging down over the breast a necklace of human hands and hearts with a death head pendant in the center. Coatlicue seems to have been regarded as a very old woman and as the mother of the Aztec gods.

they had two great periods, one in the south from 160 to 600 A.D., and one in the north between 950 and 1250 A.D. Examples of the architecture of the Maya are to be seen in the models at the right of the hall and in the cast of the great serpent column from Chichen Itza, Yucatan, at the left. Distinctive features are the absence of the true arch, the profuse use of decoration, the thick walls, and the high foundation platforms. Pottery and other objects are shown in the adjoining cases.

More ancient than any of the specimens in the hall are the little figurines in clay which were made by the "Archaic" people of Central Mexico and are exhibited in the first table case at the right of the hall. Farther along to the right beyond the temple models one finds objects representative of the highly civilized Toltecs whose remains lie above the "Archaic" stratum, when the two are found together. Their civilization reached its peak in the ninth or tenth century of our era and was in contact with the later Empire of the Maya. Succeeding the Toltecs in the control of Central Mexico were the Aztecs, who were the reigning power at the time of the Spanish conquest. Objects relating to their daily life are shown in the next cases. The casts of their statues indicate not only their artistic skill but also the complexity of their religion with its many gods. Attention is called to the great statue of the Goddess Coatlicue and the head of the Goddess Coyolauqui. The interest of the Aztecs in history and science is evident from the reproductions of their manuscripts in the table cases immediately opposite, and from the two huge circular stones, one of which, the sacrificial stone at the end of the hall, records the conquests of the Aztecs before 1487; on it captives were slain as offerings to the gods. In the last table case in the center of the hall are examples of Mexican jewelry.

Other cultures only slightly less civilized are represented in this hall. Attention should be called to the remarkable pottery in plaster cloisonné from Jalisco in the next to the last A-case at the right of the hall. At the right of the exit, in the northwest wing, are pottery figures from western Mexico, presenting and sometimes even caricaturing the daily life of the people. Across the hall at the left of the exit are objects representative of the Zapotec of southern Mexico. Noteworthy are the grotesque funeral urns made as offerings in tombs, perhaps like the model at the end of this hall.

Pottery

Moving back up the hall, in the next A-case one sees specimens from Vera Cruz. Especially fine are the Totonac laughing faces from the southern part of the state. In the same row near the window are musical instruments, such as flutes from southern Mexico, and drums, one an original from near Mexico City. The Muir collection of vessels

ANCIENT GOLD OBJECTS FROM COSTA RICA

Gift of Minor C. Keith.

and figurines from near Tampico, in the next A-case, shows certain resemblances to the "Archaic" specimens at the other end of the hall.

The adjoining cases contain a collection of pottery vessels from San Salvador, which includes many painted vessels with designs like those on Maya pottery, and examples of a unique ware, glazed by natural agencies, which were carried in trade the length and breadth of Central Mexico, so highly was it esteemed.

The table cases adjacent contain reproductions and originals of the Mexican and Maya manuscripts previously mentioned.

The remainder of the hall is devoted to the remarkable Minor C. Keith collection of Costa Rican antiquities. The stone work, comprising statues and implements for daily and ceremonial use, shows the artistic proficiency of this people even more strikingly than the variety and excellence of shape and design in their pottery. The ornaments in gold and jade in the table cases at the center of the hall display even further the technical skill and high artistic sense of these people.

While one is accustomed to think of the Aztecs, and by association, all ancient Middle Americans, as warlike savages, the collections here exhibited show their main concerns of life to have been pacific, and devoted to the advancement of their industries, arts, and sciences.

(For further details see *Handbook* No. 3, Ancient Civilizations of Mexico and Central America. By H. J. Spinden.)

SOUTHWEST PAVILION

EVOLUTION OF PREHISTORIC CULTURES

NATURAL HISTORY OF MAN

Continuing west we pass into the Southwest Pavilion, given over to a demonstration of the chronological development of the principal human arts and industries initiated before the days of written history, the era of the Cave Man and the Lake Dweller. The section of the hall to the left, or south of the center aisle, is devoted to the Old World, while the section to the right is given to the New World. There are four rows of table cases in the hall and each row or tier constitutes a unit, or part of a unit, and should be examined in order, beginning next the entrance and going towards the opposite west wall.

Cave Man and the Lake Dweller

The first table case on the left gives a key exhibit for the Old World. Here is shown the order of development of several of the most common tools, weapons, utensils, and ornaments, ranging, as in the case of the ax, from crude "eoliths" many thousands of years old up to the metallic forms more or less like those in use at the present time. The various stages of improvements are arranged in levels, and new forms of tools, with correspondingly new arts and industries, will be seen to make their appearance in each of the successive levels, as the case is viewed from front to back, beginning at the left end. The succeeding cases in this row take up all the different levels here indicated, treating each one as fully as the available archæological material permits.

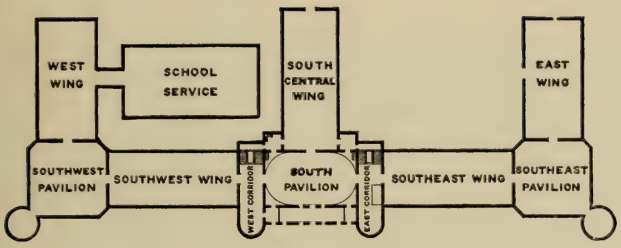
The Evolution of Cultures

The adjoining row of cases on the left, next the windows, gives the stratigraphically determined order of cultural development for several separate localities in the Old World, such as France, the Baltic region, Switzerland and Egypt. Here are shown the fragmentary, but strictly scientific, details of the story told in simplified form in the first row of cases.

The northern half of the hall, and the wall cases devoted to America, will be arranged on the same general plan.

The wall frescoes are copies of early European cave art; those in the northern half are copies of American Indian art, most of late prehistoric date.

Return to the East Corridor (Elevators) and ascend to the Third Floor.



THIRD FLOOR

SOUTH PAVILION

PRIMATES

Facing the entrance is a group of gorillas, collected and mounted by Carl Akeley. When the Akeley African Hall is completed, these specimens will form part of a habitat group there.

In the rear of this case is a series of typical examples of the principal groups of Primates, illustrating also their mode of progression and emphasizing the point that man is the only member that stands upright, whose forelimbs take no part in locomotion, and who has perfectly developed hands.

The Systematic Series of Primates, intended to give some idea of the number of species in this order, and their range in size, form and color, begins on the left with examples of man and is continued in the wall cases around the room, ending with the lemurs. Noteworthy among the Primates is the Gorilla, largest and most powerful of apes, the curious "Proboscis" Monkey from Borneo, and the Aye-aye of Madagascar.

On one side of this case is a group of the beautiful Horse-tailed Monkeys, which are threatened with extermination owing to the demand for their fur, and on the other a troop of South American Spider Monkeys.

Groups

The closed corridor contains a few groups of Primates characteristic of various parts of the world, Africa, Asia, South America and Madagascar, and a group of African Pygmies, a "low" race to be contrasted with the "high" apes.

The African Red Monkeys are rolling up the moss, hunting for insects, and the Red Howling Monkeys are in their favorite home among the tree tops.

Outside of the central corridor, on the south side of the hall, is a group of Orang Utans from Borneo; this was one of the first groups of large animals to be mounted in this country and it was looked upon as a daring innovation.

AFRICAN PYGMIES

Group in the Hall of Primates

Figures by Frederick Blaschke, background by Charles Corwin

GORILLAS
Collected and mounted by Carl Akeley
Part of habitat group for the Akeley African Hall

On the south side of this hall is installed a notable series of photographs of wild animals donated to the Museum by the men who took them. They were originally part of a competitive exhibition of wild animal photographs shown at a meeting of the American Society of Mammalogists.

Animal Photographs

At the west, or farther end of the hall, a series of skeletons enables the student to study the comparative structure of the Primates and note the changes that take place in passing from Lemurs to Man.

Structure of Primates

Temporary Exhibits

The fruit bats, often known as flying foxes, the largest members of the order, and found only in the warmer parts of the Old World, are represented by a small portion of a colony from Calapan, Philippine Islands. Such a colony may number several thousands, and may be very destructive to bananas and other fruits.

Fruit Bats

Temporarily placed in this hall also is a small exhibit of domesticated dogs, which, though small, includes some noteworthy examples of various breeds. These are of interest both as showing the effects of breeding, selection by man, and as noting the changes brought about by fashion. Some breeds have almost disappeared. There is no example of the once popular Pug, which, as well as the Black and Tan, is now rare, and the Newfoundland is practically extinct in the United States. On the other hand the Police or Shepherd dog is now common and the Toy Pomeranian has been "created" comparatively recently.

Domesticated Dogs

East Corridor

To the left of the elevators is a room set apart for the use of honorary or subscribing members of the Museum where they may leave their wraps, rest, write letters, or meet their friends. It contains the portraits of the Presidents of the Museum and of Mr. Choate and Professor Bickmore who played a most important part in the founding of the Museum. Here too may be found books by members of the Museum staff, in many cases based on or describing the expeditions in which they have taken part.

Members' Room

Southeast Wing

SYNOPTIC SERIES OF MAMMALS

Proceeding east from the hall containing apes and monkeys, we pass the elevators to enter the *Southeast Wing*, devoted mainly to a series of exhibits illustrating the characters of mammals, their principal

MEMBERS' ROOM

groups, or orders, the main subdivisions of these, known as families, and various interesting peculiarities of habits and structure. Each family is, so far as possible, represented by a mounted specimen and a skeleton. Walking around the room from left to right, one passes from the egg-laying Platypus to man, represented by the figure of an Australian native, armed with the characteristic boomerang. Incidentally one sees among other things the modifications of form and structure for various modes of locomotion, notices the superiority in brain of mammals over other vertebrates, learns that animals that outwardly look alike may be very distantly related, sees illustrations of albinism and melanism, is shown how the coat of the hare changes from brown to white, and adaptations of plants and animals to a desert habitat.

Of special note is the skeleton of Jumbo, the largest elephant ever brought to this country.

Model of Sulphur-bottom Whale

The most striking object in the hall is the life-size model of a sulphur-bottom whale, seventy-six feet in length. The original of this specimen was captured in Newfoundland, and the model is accurately reproduced from careful measurements. This huge creature is not only the largest of living animals, but, so far as we know, the largest animal that has ever lived; a specimen of this size weighs from sixty to seventy tons, twice as much as *Brontosaurus*. Although whales and propoises live in the water, they are not fishes, but are warm-blooded and breathe by means of lungs, not gills. The whale must come to the surface to breathe, and the so-called "spouting" is merely the result of the warm air being expelled from the lungs when he breathes. A whale does not spout *water*, as is commonly supposed.

[Recent additions to the Museum building include a large hall to contain whales and other marine animals, in which are shown reproductions of porpoises and skeletons of whales. See *Hall of Ocean Life*, p. 32.]

Insect Exhibits

In the rail cases are exhibits which aim to give the visitor a general idea of the enormous class of insects. Special exhibits of the common butterflies found near New York City, another of the Moths of the Limberlost, and another of spider-webs, have been installed, and several sections are devoted to silk, looking at it from both the entomological and human view points.

Species from the eastern United States are arranged with extracts from Dr. Lutz's "Field Book of Insects" as labels, and a collection of

insects from a suburban yard shows how many species may literally be taken "at our doors."

Study Collection of Insects

The general study collection of insects is on the fifth floor, and while it is not on exhibition, the curators will be glad to show it to visitors on application.

Southeast Pavilion

HALL OF INSECT LIFE

Proceediug east, we enter the *Insect Hall*. The installations in this hall point out the relationships, through origin and mode of life, of insects to each other, and to the other members of the Animal Kingdom, especially to man. The exhibits are arranged in a continuous series. They are numbered, and eventually will be labeled, so that we can easily follow the plan, beginning at the first case at the right and making a circuit of the hall.

Insect Life

First is an introductory section, Case No. 1, illustrating by diagrams the importance of insects as shown (a) by the large number of species compared with other animals [there are three times as many species of insects as of all other animals put together], and (b) by their great influence on human interests. In the United States the economic loss by insects is more than five times as great as by fire, and there are more than twelve times as many deaths from insect-borne diseases as from railroad accidents. On the other hand, many of our crops and most beautiful flowers are largely dependent upon pollination by insects.

Importance of Insects

In the second section of Case No. 1 is a diagram illustrating the major groups of Arthropods, followed by a series of wax models showing the growth of an insect within the egg.

Key to Arthropods

In the opposite side of Case No. 1, and in one section of Case No. 2, are a number of exhibits illustrating the Anatomy and Physiology of Insects.

Anatomy and Physiology

The remaining sections of Case No. 2, and part of Case No. 3, are devoted to exhibits explaining the terms used in the Classification of Insects and exhibiting the principal families, finishing with a diagrammatic chart showing the near relatives of insects. The third section of Case No. 3 contains an exhibit of the largest and smallest insects, and the fourth section is a chart illustrated by specimens showing the relatives of insects.

Classification of Insects

The exhibits of economic importance begin with Case No. 4, which contains the Japanese beetle and the European Corn-borer, and Case No. 5, devoted to the Gypsy Moth and the Brown-tail Moth. The

THE BUTTERFLY GROUP

The Monarch Butterfly—migrating; the group contains over 1200 specimens.

following Cases, No. 6 to No. 15, contain exhibits of insects associated with special plants, and are followed (Cases No. 17 and No. 18) by a study of household insects. Insecticides and the apparatus used by man in his efforts to combat insects are shown in Case No. 19, while Cases Nos. 20 and 21 show how man's efforts to combat noxious insects are supplemented by the activities of lower animals, birds, fish, reptiles, and of insects themselves.

Although certain insects destroy plants, certain plants destroy insects. Some of these interrelations are illustrated in the last section of Case No. 21.

Occupations of Insects

Among insects are found carpenters, masons, weavers, papermakers, and other sorts of laborers. Some of this work is exhibited in Case No. 22. The making of silk, one of the principal insect activities, is shown in the wall cases Nos. 39 to 44.

Evolution is a large subject, but the principal points involved in the present-day theories are illustrated in Cases Nos. 24 to 27, which treat such problems as Mimicry, Protective Coloration, Adaptation, Variation, Mutation, Geographic Distribution, Selection, and Inheritance.

Cases Nos. 29 to 31 are devoted to social insects and their relatives. In this connection, on the north side of the hall, will be found several groups showing the activities of these interesting creatures.

The last case, No. 32, has one half devoted to exhibits showing the outfits used in collecting and preserving insects. The other half includes a variety of things, being answers to the questions most frequently asked the Curator by the general public.

The central portion of the corridor has been set aside for habitat groups, several, such as the Baltimore Butterfly, Cabbage Butterfly, Monarch Butterfly, Tiger Swallowtail, Spice-bush Swallowtail, Lady Beetles, and Japanese Beetles, have been installed, and others are in the course of preparation.

Cases extending around the wall have been installed, and some of the exhibits which were in the rail cases in the Southeast Wing have been moved to these cases. The silk exhibit, as noted above, occupies Cases Nos. 39 to 44. An exhibit of insect galls is in Cases Nos. 64 to 66, and some of the insects of a suburban yard are being moved to Cases Nos. 67 to 72. Exotic insects will also be added. There are at least half a million species of insects in the world, so that, even when finished, the series will contain only a small part of the total.

Artificial light does not fade colors as readily as daylight, so we have adopted a system of lighting each case individually, and have excluded the natural light. This system not only enables us to see the smaller

DRAGON LIZARDS OF KOMODO

The largest of existing lizards, reaching a length of over nine feet and a weight of over 200 pounds.
Obtained by Douglas Burden

specimens more distinctly, but the more delicate specimens are less apt to fade.

We have supplemented our static exhibits by a few examples of living creatures. These have been temporarily placed in the southeast corner of the hall.

East Wing

HALL OF REPTILE LIFE

On entering the hall, one is attracted by four floor groups containing the largest of existing reptiles.

Dragon Lizards

On the right is a habitat group of the Dragon Lizards of Komodo Island. These are the largest of living lizards and are found only on two small islands of the East Indies.

Near this group a large chart is installed, showing in outline the history of all the vertebrate animals, including the dragon lizards.

The visitor will be attracted first to the many floor groups in the main room, these showing reptiles and amphibians in their natural environment. The cases on the right of the hall answer such common questions as, "How do reptiles and amphibians feed?" "How protect themselves?" and "How breed?" or "What is the economic value of reptiles and amphibians?"

The left wall of the main hall is equipped with sunken cases, in which some of the principles controlling the existence of reptiles and amphibians are illustrated. Among these exhibits are "Natural Selection, the Directing Principle of Evolution," "Isolation, a Major Factor in the Origin of Species," "Concealing Coloration and Form," "Parallel Evolution," etc.

At the far end of the hall is a case devoted to snake yarns, another to the reptile skeletons. Of special interest is an exhibit of snake poison and its treatment.

On the left of the hall, in an enclosed corridor, is a series of habitat groups portraying the home life of American reptiles and amphibians.

The Rhinoceros Iguana group illustrates the complete life story of a single lizard.

The Gila Monster group portrays the home life of the only poisonous lizard. The Giant Salamander group shows the life history of the largest American salamander.

Of special interest is the large Cypress Swamp group at the far end of the corridor.

The nesting habits of the alligator, as well as those of a turtle, are shown in the exhibit. Many facts of biological interest, such as mimicry, sexual dimorphism, and retrograde evolution, are to be found in the group.

Return to the South Pavilion

THE ORIZABA GROUP

The observer is looking across the valley of the Rio Blanco, over the tropical forest, to Mount Orizaba

South Central Wing

BIRD GROUPS

Here are the Habitat Groups of North American birds. This unique series of groups shows the habits of some typical American birds in their natural haunts. The groups have been prepared under the immediate direction of Dr. Frank M. Chapman, Curator of Ornithology, who collected most of the specimens and made practically all the field studies necessary for their reproduction. In the course of this collecting, he traveled more than 60,000 miles. The backgrounds are reproductions

DUCK HAWK ON PALISADES OF THE HUDSON

Realism and artistic effect have been achieved in the Habitat Bird Groups, and they present vividly many stories of adaptation to environment.

of specific localities, painted from sketches made by the artist who usually accompanied the naturalists when the field studies for the groups were made. Practically all sections of the country are represented; thus the series not only depicts characteristic bird-life of North America, but characteristic American scenery as well. The backgrounds of the groups were painted by Bruce Horsfall, Charles J. Hittell, Hobart Nichols, Carl Rungius, W. B. Cox, Louis A. Fuertes and Francis L. Jaques. The foliage and flowers were reproduced in the Museum labora-

tories from material collected in the localities represented. Each group is fully described in the label attached to the case. (See *Guide Leaflet* No. 28). Beginning with the case at the right of the entrance and passing on to the right around the hall, we find the groups arranged in the following sequence:

Orizaba Group

The distribution of birds, notwithstanding their powers of flight, is limited in great measure by climate. Thus in traveling from Panama north to Greenland there are zones of bird-life corresponding to the zones of temperature. This condition is illustrated on the mountain of Orizaba in Mexico, where in traveling from the tropical jungle at its base to its snow-clad peak the naturalist finds zones of life comparable with those to be found in traveling north on the continent. Thus the Orizaba group, so far as the distribution of life is concerned, is an epitome of all the groups in the hall.

Cobb's Island Group

Among our most beautiful and graceful shore-birds are the terns and gulls, which (because of their plumage) were once so ceaselessly hunted and slaughtered for millinery purposes. Thanks to protection they have now greatly increased in numbers. The group represents a section of an island off the Virginia coast, where the birds are now protected by law.

Duck Hawk Group

The duck hawk may be found nesting on the Palisades of the Hudson almost within the limits of New York City. It nests on the ledges of the towering cliffs. This hawk is the peregrine falcon which was so much used for hunting in the Middle Ages. It often comes into the city for pigeons.

Hackensack Meadow Group

In August and September the meadows and marshlands, bordering the Hackensack River, New Jersey, formerly teemed with bird-life, but this is rapidly disappearing before the march of "improvements." In the group showing these Hackensack meadows are swallows preparing to migrate southward, bobolinks or "rice birds" in autumn plumage, red-winged blackbirds, rails, wood ducks and long-billed marsh wrens.

Wild Turkey Group

The wild turkey is native of America and was once a abundant in the wooded regions of the eastern portion of the United States, but is now very rare. It differs slightly in color from the Mexican bird, the ancestor of our common barnyard turkey, which was introduced from Mexico into Europe about 1530 and was brought by the colonists to America. (Reproduced from studies near Slaty Forks, West Virginia.)

Florida Great Blue Heron Group

The great blue heron usually nests in trees. The bird flies with its neck curved back on its body, and because of this habit it can readily be distinguished from cranes, with which it is frequently confounded. (Reproduced from studies near St. Lucie, Florida.)

Water Turkey or "Snake-bird" Group

In the "bonnet" or yellow pond-lily swamps grown with cypresses and cabbage palmettoes, the shy water-turkey builds its nest. It receives the name "turkey" from its turkey-like tail, and the title "snake-bird" from its habit of swimming with only the long slender neck above water. (Reproduced from studies near St. Lucie, Florida.)

Sandhill Crane Group

Unlike the herons, the sandhill crane builds its nest of reeds in the water. It differs also in its manner of flight, always fully extending its neck when on the wing. (Reproduced from studies on the Kissimmee Prairies of Florida.)

Brown Pelican Group

Pelican Island, on the Indian River of Florida, has been made a reservation by the United States Government, and these grotesque birds formerly bred there in comparative safety. The view shows a section of the island at the height of the nesting season. Notwithstanding the hundreds of young birds that are clamoring for food, observation has shown that the parent bird can pick out its own offspring with unfailing accuracy. (Reproduced from studies at Pelican Island, Florida.)

American Egret Group

This beautiful bird has been brought to the verge of extinction in this country through the use of its "aigrette plumes" for millinery purposes, and is now confined to a few protected rookeries in the South. The birds have these plumes only during the nesting season, at which time the death of the parent means the starvation of the young. (Reproduced from studies in a rookery of South Carolina.)

Turkey Vulture Group

The turkey vulture, or "buzzard," is one of the best-known birds of the South, where it performs a valuable service in acting as a scavenger. On this account it is protected by law and by public sentiment and has become both abundant and tame. (Reproduced from studies at Plummer Island in the Potomac River, near Washington.)

California Condor Group

The California condor is the largest and one of the rarest of North American birds. It is not so heavy as the condor of the Andes, but has a slightly greater spread of wing—eight and one-half to eleven feet. In the group the visitor is supposed to be standing in the interior of the condor's cave, and is looking down on the river of the cañon. (Reproduced from studies in Piru Cañon, California.)

BROWN PELICAN GROUP

One of the Habitat Groups of North American birds and by many considered the most effective. Although protected by law, the settlement of the adjoining shore caused the birds to abandon this island.

The foreground of the group shows a detail of the island that is painted in the background. The young birds are feeding, and it will be noticed that one fledgling is reaching well down the mother's throat after the predigested food. (Reproduced from studies at Monterey, California.)

Brandt's Cormorant Group

Formerly this area was an arid place with a characteristic desert bird fauna. Now the ranchmen have irrigated the land and aquatic bird-life abounds. This group is a good illustration of the influence of man on the bird-life of a region.

San Joaquin Valley Group

Little Diomede and Big Diomede form a group of two islands which lie in Bering Sea, fifty miles south of the Arctic Circle and about midway between Alaska and Siberia.

Bering Sea Bird Group

The international boundary line passes between them, Big Diomede being Russian and Little Diomede American. The land to the southeast in the central distance of the background is Cape Prince of Wales, a part of the Alaskan mainland distant twenty-three miles. To the right is Fairway Rock.

The site of the group is the lower part of the 1000–foot cliff at the south end of Little Diomede. Here, protected by isolation, as well as by the nature of their haunts, myriads of Murres, Guillemots, Puffins, Auklets, Gulls and Cormorants come each summer to lay their eggs and rear their young. The Murres nest on rocky shelves, laying highly colored pear-shaped eggs which when moved describe a circle about their tip and thus do not roll off the narrow ledges on which often they are laid.

The Guillemots, Puffins and Auklets lay in crevices and holes; the Gulls and Cormorants build crude nests.

Like many other arctic birds, some of those here shown are widely distributed in boreal waters, and hence are found, or are represented by near relatives, on the eastern side of North America, where Murres, Guillemots, Puffins and Kittiwakes nest as far south as Bird Rock, Gulf of St. Lawrence. A group from that rock is shown at the left of the entrance to this hall.

There were estimated to be two thousand nests in this colony. The flamingoes construct their nests by scooping up mud with their bills and packing it down by means of bill and feet. The nests are raised to a height of twelve or fourteen inches; this protects eggs and young from disasters due to high water. Only one egg is laid, and the young is born covered with down like a young duck and is fed by the mother on predigested food. (Reproduced from studies in the Bahama Islands.)

Flamingo Group

Booby and Man-of-War Bird Group

In this group is shown a portion of a coral islet on which three thousand boobies and four hundred man-of-war birds were nesting, the former on the ground, the latter in the sea grape bushes. (Reproduced from studies in the Bahama Islands.)

Florida Rookery Group

The abundance of bird-life in one of these rookeries is quite astounding. In this group are roseate spoonbills, snowy egrets, American egrets, little blue herons, Louisiana herons, ibises, cormorants and water-turkeys. Because of the great inaccessibility of this island it was one of the last places to feel the depredations of the plume-hunter. (Reproduced from studies in the Everglades of Florida.)

Whistling Swan Group

A Whistling Swan on the nest is visible far across the arctic tundra, the summer home of this species. The nest is built of moss, etc., and in it are laid two to five white eggs, four and a quarter inches long. Both male and female share the labor of nest-building, incubation, and caring for the young. The cygnets are clothed in white down, soon displaced by grayish plumage, in which they travel south with their parents in the autumn.

Swans feed chiefly on the grasses and tender water-plants they pull from the bottom. Small mollusks are also eaten.

Swans are famous for their loud clear voices.

The Whistling Swan breeds in arctic Alaska and Canada east to Hudson Bay. In winter it is not uncommon locally on the Atlantic Coast south from Maryland and along the Mississippi Valley, Gulf Coast and Pacific Coast. In the Northeast it is a rare migrant.

Whooping Crane Group

The whooping crane is so nearly exterminated that not only was it impossible to obtain a nest and young, but in making this group it was necessary to use specimens taken many years ago.

Golden Eagle Group

The golden eagle is one of the most widely distributed of birds. In North America it is now most common in the region from the Rockies to the Pacific Coast, although it is found as far east as Maine. Stories to the contrary notwithstanding, the eagle never attacks man, even though the nest is approached.

Its food consists of rabbits, squirrels, woodchucks and occasionally sheep. (Reproduced from studies near Bates Hole, Wyoming.)

Klamath Lake Group

The abundance of bird-life in this western lake was astonishing. Here is an example of how the normal nesting habits of a bird may be changed by its being driven into a different locality. In the Group are white pelicans, which usually make a nest of pebbles; Caspian terns, which commonly build their nests on sand,

and cormorants that nest on rocks, all nesting together here on the tule or rush islets of the lake. It is sad to record that the breeding ground shown here, with its wonderful bird-life, has been destroyed by ill-advised drainage. (Reproduced from studies at Klamath Lake, Oregon.)

THE WHOOPING CRANE

A bird almost extinct. Shown in the Habitat Groups

Arctic-Alpine Bird-Life Group

The scene represented in this group is above timber-line on the crest of the Canadian Rockies, 8,000 feet above the sea. Although these mountains are in the temperate region, the altitude gives climatic conditions that would be found in the Far North, and the bird-life is arctic in character. Here are nesting the white-tailed ptarmigan, rosy snow finches and pipits. (Reproduced from studies in the Canadian Rockies.)

Sage Grouse Group

This group shows a stretch of western plateau covered with sage brush. In this brush is seen the male sage grouse strutting and wooing a mate. (Reproduced from studies at Medicine Bow, Wyoming.)

Prairie Chicken Group

The prairie chickens are akin to the common grouse. The group represents a typical scene during the mating season. The male birds go through most surprising antics in their efforts to attract the females. They inflate the orange-colored sacs on the sides of their necks, dancing and strutting about and uttering a loud, resonant, booming note. (Reproduced from studies near Halsey, Nebraska.)

Wild Goose Group

The wild goose is one of the first birds to migrate north in the spring. It nests among the lakes of Canada even before the ice is melted. To secure the young birds for this group it was necessary to hatch the eggs of the wild goose under a hen, so difficult it is to secure the young in nature. (Reproduced from studies made at Crane Lake, Saskatchewan, Canada.)

Grebe Group

The grebes are aquatic birds which build their nests in the water. During the incubation period the parent bird usually covers the eggs with grass and reeds when leaving the nest. Nesting at the same lake with the grebes was the redhead duck. (Reproduced from studies made at Crane Lake, Saskatchewan, Canada.)

Loon Group

The loon is justly famed for its skill as a diver, and can swim with great speed under water. Its weird call is a familiar sound on the northern New England lakes. Many loons pass the winter at sea fifty miles or more from land. (Reproduced from studies at Lake Umbagog, New Hampshire.)

Bird Rock Group

This rocky island thirty miles from shore in the Gulf of St. Lawrence affords some protection to the sea birds which still nest in considerable numbers on and in its cliffs, although the colony is a mere shadow of what it was even fifty years ago. Seven species are shown nesting in the group—the razor-billed auk, Leach's petrel, gannet, puffin, kittiwake gull, common murre and Brunnich's murre. (Reproduced from studies at Bird Rock, Gulf of St. Lawrence.) This was the Museum's first large group.

Many of these groups are, or are fast becoming, records of past conditions: as pointed out, the lower part of Klamath Lake has been unwisely drained, since the land is useless for farming, and the birds shown in the group have gone; the Newark marshes are being filled in for factory sites. The growth of population and taking up of land for

agricultural purposes unavoidably crowd out some birds, lawless shooting lessens their numbers, while predatory cats are responsible for the destruction of many during the breeding season.

(See also *Guide Leaflet* No. 28, The Habitat Groups of North American Birds.)

Return to the South Pavilion

West Corridor

Audubon Gallery

Occupying the stairway and adjoining walls is the Audubon Gallery, a noteworthy collection of objects relating to the life and work of John James Audubon. These include original sketches and paintings by Audubon, and by his son John Woodhouse Audubon mainly for the Quadrupeds of North America; some of the copper plates from which the Birds of America were printed, and a portrait of Robert Havell, their engraver, and the publisher of the first edition of the "Birds." Of special interest are the portraits of Audubon, including that by John W. and Victor Audubon, so extensively copied. Of more personal interest are the guns carried by Audubon on many of his expeditions and the buckskin suit he wore.

These objects were presented mainly by his granddaughters, Maria R. and Florence Audubon, but the largest piece, a covey of pheasants, was given by Miss M. Eliza Aububon. Gifts have been received also from Dr. Edward H. Rogers, Miss Anne E. Roelker, Robert Havell Lockwood, and others.

Southwest Wing

INDIANS OF SOUTH AMERICA

Passing through the west corridor, where some of the East Indian Mammals obtained by the Vernay-Faunthorpe Expedition are temporarily placed, into the adjoining hall to the west, we find the collections from South America. However, this exhibit is about to be transferred to the second floor, where the articles will be arranged in similar order. Just in front of the entrance is a case of striking ornaments of gold, fabled to have formed part of the treasure being assembled for the ransom of Atahualpa, but really made by a more northern race, the Chimus, and buried—we know not why. Other objects of gold or silver illustrate the skill of the ancient Peruvians in working these metals. The greater part of the hall is filled with archæological material illustrating the various forms of culture existing in Colombia, Ecuador, Peru, Bolivia and Chile, in prehistoric times. The remains found in Peru, in parts of Central America and in Mexico, show a degree of culture far in advance of that attained in any other part of this continent in prehistoric times.

PIECES OF CLOTH FOUND WITH PERUVIAN MUMMIES

The prehistoric Peruvians were familiar with modern weaves, including the finest gobelins, and produced highly decorative effects by harmonized colors and a repetition of woven-in designs. The Museum's collection of mummy cloths is one of the largest in the world, and is much used by teachers and students of art.

Unlike the ancient peoples of Mexico and Central America, the Peruvians had no written language. They were tillers of the soil and raised maize, potatoes, oca, quinua, beans, coca and cotton. They had domesticated the llama, which was used as beast of burden. They excelled in the manufacture and decoration of pottery vessels, in metal work, and in textile fabrics. In the cases directly in front of the entrance, the gold and silver objects, such as beads, cups, pins and ear ornaments, show the high degree of skill attained in the beating, soldering and casting of metals.

Gold and Silver

TREPHINED SKULLS FROM PREHISTORIC PERUVIAN GRAVES

PERUVIAN MUMMY BUNDLES AND MUMMY

The ancient Peruvians wrapped their dead in fabrics of fine cotton and wool, then covering with a sack of strong cloth. The mummy "bundle" thus produced was often given a "false head" of cloth filled with cotton or vegetable fibre. No attempt was made to preserve the bodies, but climatic conditions in Peru have preserved these mummies and their wrappings during many centuries.

In weaving they were perhaps preëminent among prehistoric peoples, many of their specimens exhibited here being unsurpassed at the present day. The materials used were cotton and the wool of the llama, alpaca and vicuña. In the first cases on the right are examples of these textiles with looms and shuttles. (*Guide Leaflet* No. 46, Peruvian Art, deals with the meaning of the figures shown in textiles and pottery.)

Textiles

The alcove cases are geographically arranged, showing exhibits from the north toward the south of South America, then up into the interior of the continent. In the wall cases extending across the entire western end of the hall will be found a remarkable collection from Nazca, Peru. The prehistoric people of Nazca excelled as colorists, particularly in the decoration of their pottery vessels, which are certainly the most beautiful so far discovered in South America.

The special exhibits in the gallery rail cases include quipus used to keep accounts; charms and medicines; coca which was chewed with lime, and shells that were found in mummy bundles and in the graves. A number of the chicha jars are on exhibition on top of the cases.

Many of the objects exhibited here are from mummy bundles. In no part of America are found so many and so extensive burial places as in the coast region of Peru. Here were interred countless thousands of the ancient dead. In the *huacas* or graves, with the bodies were placed such articles as had been most useful and highly prized during life, and such as it was considered would be most serviceable in a future life.

Mummy Bundles

To this custom we are indebted for no small part of our knowledge of the daily life of the ancient Peruvians. From the mummy bundles and graves, all the objects in the extensive collections in this hall, illustrating their civilization, have been obtained. The wonderful state of preservation shown in the textile fabrics and other perishable materials from the coast regions is due to the extreme dryness of the climate and the nitrous character of the soil.

The mummy in the case at the west end of the room was found in a copper mine at Chuquicamata, Chile. The body is that of an Indian miner who was killed by the falling in of rocks and earth while engaged in getting out the copper ore (atacamite) used by the Indians in making implements and ornaments in prehistoric times. The tissues of the body have been preserved by copper salts with which it is impregnated. The implements he was using at the time of his death are shown beside him in the case.

Chilean Mummy

SOUTHWEST PAVILION

CHINESE AND SIBERIAN COLLECTIONS

Collections from Asia

If we pass on into the hall at the extreme west end of the building, we find collections from eastern and northern Asia. Specimens illustrating the culture, industries, religion and manufactures of China are on the left; others, showing the mode of living, the costumes, and the war implements of Siberia, are on the right, while in the tower will be found exhibits from Japan.

The furwork, costumes and rugs of the people of eastern Siberia reveal remarkable skill in workmanship. Two models show respectively summer and winter scenes in Siberia. In the rear are collections from the Ainu and the Amur River tribes noted for decorated fabrics and picturesque costumes. Swinging frames contain a large series of fabric designs.

ANCIENT CHINESE BRONZES

The collections on the left side of the hall deal mainly with the everyday life of the modern Chinese and have a special value, as they were made just before the sweeping changes of the last few years took place. These abolished many of the customs in which these objects were used; for example, the series of weapons and objects showing the tests to which a soldier was submitted on entering the army have been rendered obsolete by the introduction of modern weapons and tactics. Bamboo, porcelain, basketry, inlaid work, cloisonné enamel, agricultural imple-

ments, carvings in wood, ivory and stone, and embroidery, are shown to advantage.

A special collection of great value is found in the ancient bronzes shown in the wall cases near the entrance, and in one of the alcoves on the west side is a series of objects from Tibet, illustrative of the costumes and religious rites of that little-known region.

Southwest Tower

An exhibit of Japanese objects is installed in the adjoining tower room.

West Wing

COLLECTIONS FROM AFRICA

In the *African Ethnology Hall*, the installation is roughly geographical, i.e., as one proceeds through the hall from south to north he meets the tribes that would be found in passing from south to north in Africa, and the west coast is represented along the west wall, the east coast along the east wall, the central Congo tribes at the far end.

There are three aboriginal races in Africa: the Bushmen, the Hottentots, and the Negroes. In the north the Negroes have been greatly influenced by Hamitic and Semitic immigrants and become mixed with them.

Nothing is more characteristic of the Negro culture, to which the rest of the hall is devoted, than the art of smelting iron and fashioning iron tools. The process used by the African blacksmith is illustrated in a group near the entrance, on the west side, and the finished products, such as knives, axes and spears, are amply shown throughout the hall. The knowledge of the iron technique distinguishes the Negro culturally from the American Indian, the Oceanian and the Australian.

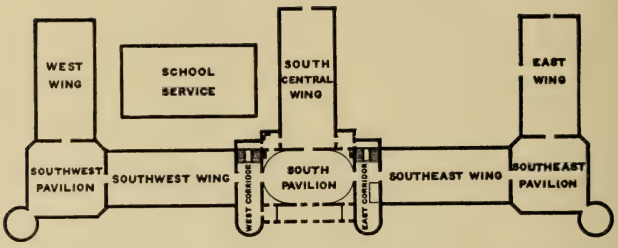
All the Negroes cultivate the soil, the women doing the actual tilling, while the men are hunters and, among pastoral tribes, herders. Clothing is either of skin, bark cloth, or loom-woven plant fiber. The manufacture of a skin cloak is illustrated by one of the figures in the group to the left of the entrance; bark cloths from Uganda are shown in the northeastern section of the hall, while looms and the completed garments are shown in the large central rectangle devoted to Congo ethnology. The most beautiful of the last-mentioned products are the "pile cloths" of the Bakuba, woven by the men and supplied with decorative pattern by the women. Very fine wooden goblets and other carvings, especially a series of ivories from the Congo, bear witness to

the high artistic sense of the African natives, who also excel other primitive races in their love for music, which is shown by the variety of their musical instruments.

A unique art is illustrated in the Benin case in the northern section of the hall, where the visitor will see bronze and brass castings made by a process similar to that used in Europe in the Renaissance period. It is doubtful to what extent the art may be considered native.

The religious beliefs of the natives are illustrated by numerous fetiches and charms, believed to give security in battle or to avert evils. Ceremonial masks are shown, which were worn by the native medicine-men.

Return to the East Corridor (Elevators) and ascend to the Fourth Floor.



Fourth Floor

FOREWORD ON FOSSIL VERTEBRATES

In a general way, fossils are the petrified remains of plants or animals that lived at some past period of the earth's history. Sometimes, as with the bones of the great Irish elk, the objects have been buried in swamps or bogs, and in a few rare instances, as with the mammoth and woolly rhinoceros, entire animals have been preserved for thousands of years in ice or frozen mud. Fossils are found in localities where the dead animals or plants were gradually buried under layers of sediment to such a depth and for so long a time that they finally became petrified. Later, through upheaval and erosion, they are again brought to or near the surface of the earth. Petrifaction is the slow replacement of animal or vegetable material by such minerals as carbonate of lime or silica, which are carried in solution by the underground waters. The process is very slow and for this reason flesh is never petrified. Fossil beds are found in every continent. In our own country, Texas, Montana, Wyoming and the Bad Lands of South Dakota are famous for their large fossil beds, and many of the finest and rarest fossils in the Museum were obtained in these localities.

As it takes thousands of years for the various layers of earth to accumulate over the bones, and for the latter to become petrified, the study of fossils and of the strata in which they are found is an important aid in determining the age of the earth and the succession of life thereon. The skeletons exhibited in these halls are of animals which lived from 30,000 to 20,000,000 years ago.

To prepare a specimen for exhibition, the matrix in which the bones are imbedded is carefully chipped away and the missing parts restored in cement and plaster. The bones are then assembled as in life. In the specimens on exhibition the restored parts differ in color from the original parts of the skeleton and can readily be distinguished.

As a whole, the Museum collections of fossil vertebrates are believed to be the finest in the world, if we take into consideration not merely numbers, but also variety, quality and perfected methods of preparation and exhibition.

South Pavilion

HALL OF THE AGE OF MAN

The *South Pavilion* is devoted to early man and his contemporaries, the mammoths and mastodons and the giant ground sloths of South America. Down the center of the hall is the collection illustrating what is known of the early history of our own race as shown by the remains of early man and the implements used by him. As fossil remains of man are rare and usually very fragmentary, these are represented mainly by casts, but they include examples of all the more perfect and more noteworthy specimens that have been found, from the Neanderthal and Gibraltar, to the Piltdown and Talgai. [See *Guide Leaflet* No. 52, The Hall of the Age of Man.]

Early Man

On the left is a group illustrating the famous asphalt trap of Rancho la Brea and fossils from South America, the most striking of which is the group of giant ground sloths. There are also good examples of the Glyptodon, a gigantic relative of the armadillo, of the camel-like *Macrauchenia*, the rhinoceros-like *Toxodon*, and other strange extinct animals which evolved in South America during the Age of Mammals, when it was an island continent as Australia is to-day. Here, too, is the great sabre-tooth tiger, one of the host of northern animals that invaded the southern continent upon its union with the northern world, and swept before them to extinction most of its ancient inhabitants.

Fossil Mammals of South America

The principal exhibits on the north side of the hall are the mammoths and mastodons and the series of skulls showing the evolution of the elephant. The first skeleton is the Long-Jawed Mastodon of the Pliocene, a predecessor of the true Mastodon in North America. The "Warren Mastodon" is a classic specimen. It was found near Newburgh, N. Y., in 1846, and is the finest specimen of its kind that has ever been discovered. Next to it is a fine skeleton of the mammoth: portions of skin, hair and other fragments of a mammoth carcass discovered in Alaska are also shown. While modern elephants are confined to portions of Asia and Africa, fossil remains of elephants and mastodons show that, at one time or another in the past, they were found over the greater part of the northern hemisphere.

Warren Mastodon

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CRO-MAGNON ARTISTS OF SOUTHERN FRANCE

The procession of Mammoths in the Cavern of Font-du-Gaume. One of the Murals in the Hall of the Age of Man. Painted by Charles R. Knight, under the direction of Henry Fairfield Osborn

(See *Handbook* No. 4, Animals of the Past, and *Guide Leaflet* No. 62, Mammoths and Mastodons.)

Around the walls is a series of paintings by Charles R. Knight, portraying some of the more striking animals that were contemporary with early man in Europe and America, and whose skeletons are shown below. Here are the Great Ground Sloths, the Woolly Rhinoceros, the Mammoth and Mastodon and the strange moose-like Cervalces.

Passing through the East Corridor we come to the Southeast Wing

Southeast Wing

HALL OF THE AGE OF MAMMALS

Fossil Mammals of the Tertiary Period

Evolution of the Horse

A particular feature of this hall is the wonderful series in the first alcove on the right showing the evolution of the horse. The Museum is justly proud of this collection, which is one of the most complete series of fossil horse skeletons in the world, and contains two skeletons of *Eohippus*, the little four-toed dawn horse, and numerous other unique specimens. As shown by skeletons of horse and man in another hall, the single toe of the horse corresponds to the middle finger or toe of man, and the other leg and arm bones correspond bone for bone with those of man. In the modern horse, the other fingers and toes have disappeared or have been reduced to "splint bones," but the remote ancestor of the horses must have had five toes. So far, this ancestry has been traced back to the four-toed stage. (See *Guide Leaflet* No. 36, The Evolution of the Horse.)

In the Horse Alcove is given a synoptic series showing the stages of evolution of teeth and limbs in the different geologic epochs and also a series of complete skeletons. These skeletons, including some of the finest ever unearthed, fully illustrate the various four-toed, three-toed, and one-toed stages and make it easy to follow the evolutionary changes that have taken place. Opposite the horse exhibit, in the first four alcoves on the other side of the hall, are specimens illustrating the evolution of the camel, deer, and other cloven-hoofed animals. Like the cow of to-day, these animals walk on the tips of the third and fourth toes, and the gradual reduction or disappearance of the other toes can be traced, much as in the horse. In addition to these, in the first alcove there is a unique skeleton of a giant flightless bird that lived at the beginning of the Tertiary Period, along with *Eohippus*.

EVOLUTION OF THE HORSE

One of the panels showing the evolution of feet and skull:

Camels

The series of camel skulls and skeletons is now being extensively studied and enlarged and will eventually form an evolutionary series comparable to that of the horse. The most interesting exhibit at present is the group of small camels in the central aisle. These graceful little animals, *Stenomylus*, lived in Nebraska at about the middle of the Age of Mammals. Four skeletons are shown exactly as they were found in the rock, and five others have been mounted in various living poses.

Entelodonts and Oreodonts

Among the other cloven-hoofed mammals, the so-called giant pigs or entelodonts and the oreodonts are especially noteworthy. The oreodonts, a totally extinct group somewhat pig-like in appearance but with teeth more like those of sheep, are strikingly represented by three complete skeletons huddled together, still intact in the rock just as death overtook them millions of years ago.

Rhinoceroses

Fossil rhinoceroses are shown near the center of the hall on the right. A fine series of skeletons illustrates the diverse types of American rhinoceroses, and a synoptic series shows the evolution of this group of mammals. The large block in the central aisle is from agate, Nebraska, and contains heaped-up bones, chiefly of the pair-horned rhinoceros *Diceratherium*, still in the original rocks found. There are twenty-one skulls and innumerable other bones in this single block. Such great abundance of fossil bones is unusual, but it gives a graphic conception of the enormous numbers of prehistoric animals that once roamed over our West. Near this, in the center of the hall, is the skeleton of *Moropus*, one of the most extraordinary of mammals, of bizarre proportions and with great claws, although it belongs among the hoofed mammals and is related to the horses and rhinoceroses.

Carnivores

The ancestry of dogs, cats, and other living flesh-eating mammals and the various sorts of extinct carnivores is shown near the middle of the hall on the left. Complete skeletons of several creodonts, very ancient carnivores of the beginning of the Age of Mammals, are particularly unusual.

Primates and Small Mammals

Beyond the carnivores on the left are cases devoted principally to the smaller fossil mammals. Although fragmentary, these are among the rarest and most interesting fossils. The fossil primates (lemurs, monkeys, etc.) include unique specimens known throughout the world because of the light they cast on the earliest stages in the origin of man. Rodents (squirrels, rabbits, and their kin), insectivores (moles, hedgehogs, etc.), and marsupials (opossums, kangaroos, and their allies) are also typically represented here. Rarest of all fossils are the remains of the first mammals, those of the Age of Reptiles, before the Tertiary Period. (See also the tiny but priceless

HORNED DINOSAUR TRICERATOPS

skulls in the next hall, found in Mongolia by the Central Asiatic Expeditions.)

At the end of the hall on the left are the remains of condylarths and amblypods, very ancient groups of hoofed mammals with no close relatives in the modern world. The most striking is the skeleton of *Uintatherium* in the last alcove, a six-horned amblypod that become extinct not long after the beginning of the Age of Mammals.

Primitive Ungulates

On the opposite side of the hall at the far end are the titanotheres, odd-toed hoofed mammals related to the horses and rhinoceroses. This group has also been long extinct, but it includes some of the largest and strangest of mammals. Many general principles of evolution have been deduced from this splendid series by President Henry Fairfield Osborn.

Titanotheres

The exhibit in this hall is made more life-like by plaster reconstructions of the animals and by sketches showing primitive horses in their environment. These paintings and models, as well as the murals and some other restorations in this hall, are by Charles R. Knight.

SOUTHEAST PAVILION

HALL OF MARINE REPTILES

In the center of this hall (later to be assigned chiefly to marine reptiles) are exhibited fossils obtained by the Central Asiatic Expeditions. Here are the famous dinosaur eggs, and skulls of *Protoceratops*, probably the creature that laid them. Here also is the skull of *Andrewsarchus*, the largest of carnivorous mammals, and the skull and feet of *Baluchitherium*, a distant and ancient relative of the rhinoceros, larger than an elephant.

Central Asiatic Expeditions Collection

SOUTHEAST TOWER

One enters the Bashford Dean Memorial Exhibit of Fossil Fishes beneath a model of the jaws of an enormous fossil shark, some 9 feet across, with actual fossil teeth set in place. This monster, closely related to the modern White Shark or Man-eater, is estimated to have been 46 feet long.

Bashford Dean Memorial

At the far end of the exhibit is a "fossil aquarium"—restorations in miniature of various well-known forms from the Old Red Sandstone of Great Britain as they would have appeared in life, including *Coccosteus*, which represents a very ancient fish type, long since extinct.

In the first alcove to the right, a wall chart illustrates the stream of fish life in geologic sequence, 500,000,000 years of fishes. It gives at a glance the basic arrangement of the specimens shown, notable among which are Ostracoderms from the Silurian and Devonian, the giant *Portheus* and the saw-finned *Protosphyræna* from the Cretaceous of Kansas.

East Wing

HALL OF DINOSAURS

On the right and left of the entrance are two good-sized, lightly but powerfully built, flesh-eating dinosaurs known as Gorgosaurus. As shown by their build and hollow bones, they were doubtless swift and fierce and preyed upon their smaller, feebler fellows as Lions and Tigers to-day prey upon Zebra, Antelope and Deer.

Struthiomimus

Near these are examples of a rather small dinosaur whose legs and general build suggest an Ostrich with a long tail, and called on account of this resemblance Struthiomimus.

Triceratops

Triceratops, big, lumbering, huge-headed, stupid creature, was a plant-eater, probably of coarse vegetation. His jaws ended, or began, in a great horny beak for clipping off branches and rushes, and his back teeth were adapted for champing them. These back teeth were arranged in many rows and were all the time pushed upward by new teeth forming below, so that as fast as teeth wore out they were replaced, a point in which Triceratops might well be envied. The fore legs, bowed outward at the elbows, enabled the animal to reach the ground with ease, and the big "frill," suggesting a fireman's helmet, was not alone for protection, but served as a counterweight to the head and jaws, so the skull almost balanced on the condyle, or ball joint by which it joined the neck.

Trachodon
Corythosaurus
Saurolophus

Across the way from Triceratops is a group of Dinosaurs which seems to have been very abundant in their day, Trachodon and his relatives, Corythosaurus, Saurolophus, and others. Among these is one of the rare prizes that sometimes fall to the lot of the collector, a specimen in which a large part of the skin has been preserved, so that we are certain as to the covering of the animal.

Tyrannosaurus

Towering above the others, his head eighteen feet from the ground, is Tyrannosaurus, the well-named King of Reptiles, whose terrible jaws and tremendous claws placed all contemporaries at his mercy, though a too careless attack on Triceratops might result disastrously.

SOME OF THE FAMOUS DINOSAUR EGGS FROM MONGOLIA

Collected by the Central Asiatic Expeditions

BRONTOSAURUS

Brontosaurus

Looming up in the distance is Brontosaurus, the Thunder Reptile, big-bodied, small-headed, with massive limbs, whose joints, in life covered with gristle, indicate that he was largely a water-dweller, where the great weight of his body, 25 to 30 tons, would be supported.

Allosaurus

Near Brontosaurus is Allosaurus, apparently turned into a fossil while munching on the tail of a defunct relative of that big beast; looking closely, one sees that the tops of the vertebræ are scored with grooves where some millions of years ago it was feasted upon by some flesh-eating contemporary.

Ankylosaurus

Two extraordinary armoured dinosaurs are represented by only parts of their skeletons. Ankylosaurus, which Dr. Lull has called "the most ponderous animated citadel the world has ever seen," had its head and body protected by thick plates of bone, while the tail, instead of tapering to a point, ends in a great ball of bone.

Beside Ankylosaurus is the fore part of Palæoscincus whose sides bristled with huge, bony spines and whose back was protected by bony plates so that he too was well able to defend himself.

(See also *Guide Leaflet* No. 70, The Hall of Dinosaurs.)

Return to the South Pavilion.

South Central Wing

GEOLOGY AND INVERTEBRATE PALÆONTOLOGY

Turning northward at the center of the Quaternary Hall, which contains the mastodons and mammoths, the visitor enters the *South Central Wing* of the building and is in the Hall of Geology and Invertebrate Palæontology.

Geology

Geology is the science of the past and present conditions of the earth. It enters into a consideration of the materials composing the earth, their composition, structure, distribution and the physical changes they have undergone or may be undergoing. It deals with minerals and their arrangement and association in rocks and ores. It considers the occurrence, distribution, origin and history of the principal kinds of rocks, namely: igneous, sedimentary and metamorphic. It especially treats of the order of deposition and sequence of the stratified beds of rock, for these, together with the fossils found in many of them, give not only a chronological account of the events in the development of the earth's crust, but reveal the succession of life forms on the earth. The processes and agents which are at work within and on the surface of the earth,

tending to modify it, such as rock weathering, underground waters, glaciation, diastrophism, vulcanism, metamorphism and gradation, are forces which are acting to-day and have been acting throughout the long history of the earth. The processes of change are most conspicuous where air, water and rocks are in contact with one another.

The field of geology is so broad that, for convenience and specialized study, it has been divided into numerous branches. The three principal branches are: (1) Structural geology, treating of the form, arrangement and internal structure of the rocks; (2) Dynamical geology, dealing with the causes and processes of geologic change; (3) Historical geology, which, aided by other sciences, aims to give a chronological account of the events in the earth's history.

Subsciences may be also recognized, namely: *Cosmic* or *Astronomic* geology, which deals with the earth as a member of the solar system, its relation to other heavenly bodies and to meteorites (solid objects which fall upon the earth from outer space); *Mineralogy*, which deals with minerals; *Petrology*, the science of rocks; *Physiography*, which treats of present land forms; *Meteorology*, which is the science of the earth's atmosphere; *Hydrology*, including Oceanography, which treats of the liquid formations of the earth, or the hydrosphere; *Palæontology*, the study of the remains and impressions of plants and animals of past ages that are found in the rocks; and *Palæogeography*, the study of the physical geography of past periods of the earth's history. Besides these general subdivisions, there are special applications of geologic knowledge which give rise to other terms, such as Economic geology and Mining geology.

To illustrate the three principal branches of geology, fifteen areas within the United States have been selected, and they are presented as illuminated topogeologic or relief map models with structure sections and backgrounds in color. They show the most evident and striking results of geologic forces acting through long periods of time. Beginning at the left near the entrance, they are as follows:

Topogeologic Models

1. The model of the Bright Angel section of the Grand Canyon of the Colorado River, Arizona. The scale is large enough to give a vivid idea not only of the extensive erosion that has taken place, but also of the geological formations. These features are so plainly exposed in beautiful colors that the Grand Canyon is one of the great wonders of the World.

2. A model of the Niagara Falls region, built to the same scale as the Grand Canyon, showing the falls and the seven-mile gorge which its waters have cut in ancient sedimentary rocks, and also the more recent glacial deposits covering the surface.

3. The Potomac River section, showing the Appalachian Mountain type of folding and erosion, with rivers adjusted to the softer rocks of Silurian and Devonian age.

4. The Van Horn, Texas, region, featuring fault block structures and a bolson basin—a depression nearly enclosed by mountains.

5. Yellowstone Park, Wyoming, including the geyser basins and Rocky Mountain type of topography.

6. The Pike's Peak, Colorado, model, showing the mountain composed of red granite, and the bordering stratified deposits of the Great Plains near Colorado Springs.

7. The caldera of Mt. Mazama, five miles in diameter and two thousand feet deep, which has been made a National Park and has become famous under the name Crater Lake. Numerous outpourings of lava suggest the structure and history of the ancient volcano.

8. The Standing Stone district near Monterey, Tennessee, showing normal subaërial erosion and the production of sink holes in horizontally disposed beds of limestone and shale.

This concludes the series of such models on the west side of the hall.

Crossing to the east aisle, one may note additional models, namely:

9. The Mt. Tom-Mt. Holyoke district of western Massachusetts, showing a great trough, traversing the ancient crystalline rocks, which was filled with the sands, muds and intruded lava flows in Triassic time.

10. The Watkins Glen-Seneca Lake district of central New York State, showing moraine deposits and other features due to the advance and retreat of the continental ice sheet over a region of horizontally bedded limestone, sandstone and shale; and, in reconstruction, the retreating glacial ice.

11. The Mt. Washington, New Hampshire, region, showing typical glacial cirques and other glacial phenomena in an area of crystalline rocks.

12. The picturesque Yosemite Valley in the Sierra Nevada Mountains of California, with U-shaped glaciated valley bottom and precipitous marginal walls.

13. The San Francisco, California, model, exhibiting a portion of the Pacific Ocean, the Coast Range with volcanic and sedimentary rocks, the California trough or inner lowland with plains bordering San Francisco Bay, and the famous strait, Golden Gate.

14. The New York City model, showing the Hudson River estuary, the crystalline pre-Cambrian rocks on Manhattan Island and to the north and east; the Triassic rocks west of the Hudson, which include

red sandstone, shale and conglomerate, the Palisades diabase and the Watchung basaltic ridges, also the glacial drift and terminal deposits on Long Island, on Staten Island, and in New Jersey.

15. The last model in this series is one of Porto Rico and the Virgin Islands, showing a narrow submerged platform and neighboring vast oceanic "deeps."

Facing the entrance of the Hall are large-scale models of the Panama Canal and New York Harbor.

Palæo-Geographic Models

At the entrance to each of the eight alcoves on the west side of the hall is placed a model which outlines a stage in the geographic development of the North American continent. The stages represented fall within the following named periods of geologic time: Cambrian, Ordovician, Silurian, Devonian, Permian, Cretaceous, Eocene and Pliocene. On each model, the present known surface outcrops of fossiliferous rock of the age represented, are shown in black. It is from this evidence and other contributing data that the extent of the ancient epicontinental seas has been determined and the shore-lines marked. On these models the present oceanic depths are shown in relief, while the various marine basins and elevated land masses on the continent are marked with colors without relief. It may be noted, by comparing these palæogeographic maps with the present outline of North America, which is shown on each model, that the geography during the first six periods was quite different from that of to-day. Nevertheless, the marine inundations and subsequent depositions were contributory factors in the upbuilding of the great continent of North America.

Copper Queen Mine Model and Exhibit

The northeastern corner of the hall is devoted to the Copper Queen Mine Model and a series of ores and other specimens from the famous Bisbee-Warren copper district in southern Arizona. Two models have been prepared as a result of several years of extremely painstaking and skilful work. A large model, some 18 by 12 feet in dimensions, shows on a scale of twenty-four feet to the inch all the surface features and buildings over four of the principal mines (Holbrook, Spray, Gardiner and Lowell) belonging to the Copper Queen Consolidated Mining Company, while a painted background represents the surrounding mountains and the town of Bisbee. The sides of the model give vertical sections to the depth of about 1,200 feet, illustrating the geology of the area and showing the general manner of getting out the ore and hunting for new deposits. There were produced in about 30 years (1880–1912) from the mines at Bisbee belonging to this company, 7,729,922 tons of copper ore of an average copper content of 7.16%, which yielded: Copper—1,106,605,775 pounds

(553,303 tons), Gold—104,775 ounces Troy (8,731 pounds), Silver—6,107,421 ounces Troy (508,952 pounds).

Near the large general model there has been installed a small model on a scale of six feet to the inch, showing the usual methods of extracting the ore by "stoping." Drilling, picking, timbering, filling old cavities, transporting, raising ore to the surface, and other operations are illustrated as well as is practicable on the scale adopted. The shaft is equipped with its cages, which are arranged so that they go up and down by means of automatic machinery.

Specimens of ore, minerals and rocks from the mine and the adjacent country illustrate the geology of the region. Chief of these specimens are, velvet malachites that were taken from the original "Queen" mine, the Open Cut, in the early eighties, and a great block of malachite and azurite weighing about four tons taken from the mine in 1892 and included in the Arizona mining exhibit at the Columbian Exposition in 1893.

Caves

The northwest corner of the hall contains a display of caves and cave material, including a reproduction of part of a beautiful cave that was discovered early in 1910 in mining operations at the Copper Queen mine. The cave was formed by the dissolving action of water traversing joints in limestone, and its walls, roof and bottom were afterward coated with calcite (calc spar) incrustations, stalactites and stalagmites, some of which are dazzlingly white while others are colored green with copper salts or pink with manganese compounds.

Alongside the Copper Queen cave is a reproduction of a chamber in Weyer's Cave, Virginia. Weyer's Cave is in a region of much heavier rainfall than Bisbee, which is probably the principal factor in producing a greater wealth of regular stalactite and stalagmite growth than adorns the Copper Queen Cave, and this exhibit illustrates not only the great variety in form but the reasons for this extraordinary diversity.

Invertebrate Palæontology

Closely connected with geology, and indeed almost inseparable from it, is palæontology, or the study of ancient forms of life. The sedimentary rocks have been found, on examination, to contain in many places remains of plants or animals, sometimes closely resembling, but more often very different from, those now living on the earth. The order of deposition of the beds, with the oldest at the bottom and the youngest at the top, together with the order of succession of forms of life thus found, gives the geologist the means of constructing a chronological chart, or time scale, depicting the eras, periods, epochs and formations of geologic time. There are five eras: Archæozoic (Primal life), Proterozoic (Primi-

A BIT OF WEYER'S CAVE

Part of the section reproduced in the Hall of Geology.

tive life), Palæozoic (Ancient life), Mesozoic (Medieval life), and Cenozoic (Modern life). The rocks of the Archæozoic era have not afforded recognizable fossils, although the indirect evidence is sufficient to assume that life existed at that time. In a few localities, fossils, as highly developed as eurypterids, have been obtained from the rocks of late Proterozoic age, as in Montana and southern Australia. Beginning with the basal period of the Palæozoic era, the Cambrian, well preserved fossils indicate that all of the various classes of invertebrate life were in existence, but not so abundant and varied as in later periods. The earliest known forms of vertebrate life are the fossil fishes from the upper Ordovician rocks of Colorado.

The exhibits of Invertebrate Palæontology include a central row of cases containing type and figured specimens, a stratigraphic or historical series on the west side of the hall, and a biologic series on the east side, as follows:

Types

In the desk cases down the center of the hall are about 8350 type and figured specimens used by James Hall, R. P. Whitfield and others in the original description and naming of species, or in their further elucidation. The specimens have been arranged in biologic order under geologic periods as entered in Volume XI of the Museum *Bulletin*.

Historical Geology

The specimens in the cases on the left or west side of the hall are arranged to illustrate Historical geology, beginning at the south (entrance) with the Archæozoic rocks, which are the lowest and oldest of all and contain no fossils, and advancing regularly through the Proterozoic, Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, Triassic, Jurassic, Comanchean, Cretaceous, Eocene, Oligocene, Miocene, Pliocene and Pleistocene periods of geologic time. Most of the specimens on exhibition are from American localities, and the species are arranged with the lower, or simpler, forms placed first. The specimens shown are those particularly characteristic of the various horizons, the object being to give an idea of the general character of the life of different periods of the world's history.

Biologic Geology

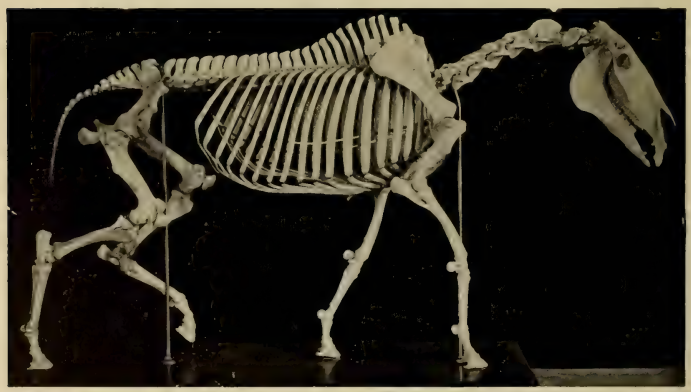
The specimens on the east, or right, side are arranged to illustrate biologic geology, the classification and relationship of the plants and animals of past geologic times. The series starts with the plants and is followed by the various subdivisions of the invertebrate animals, beginning with the lower, or simpler, forms and continuing to the highest. The order of arrangement under each class name, which is entered at the top of each case, is that found in the Zittel-Eastman text-book of Palæontology, 1913. The specimens have been drawn from foreign and domestic localities and different geologic ages.

The exhibits illustrate at a glance the wide range of variation which each group has taken during geologic time.

Fossilized Tree Stumps

In the first alcove on the right are the stump and part of the roots of a large tree from an anthracite coal mine under Scranton, Pa. Millions of years ago, in the geological period known as the Carboniferous, this tree grew upon the top of a thick swamp deposit of decaying vegetation which ultimately became a most valuable bed of coal. The stump was left in the roof of the mine when the coal was extracted for commercial and domestic uses. It fell to the floor years after the gallery had been abandoned, and it was discovered only through the chance visit of a miner.

Two stumps of a large fossil tree-fern of Middle Devonian age from Gilboa, N. Y., appear at the entrance to the alcove. These specimens were obtained from a quarry opened in connection with the great engineering work of the New York City Board of Water Supply. These are the oldest trees known.



DRAFT HORSE, PULLING A HEAVY LOAD

West Corridor

THE HORSE UNDER DOMESTICATION

This hall, which formerly held the Gem Collection, is now devoted to exhibits illustrating the great modifications that man has brought about by selection in adapting the horse to his various needs.

Under his management speed has been increased in the race horse, weight and strength in the draft horse, while for purposes of pleasure the Shetland Pony has been reduced to a diminutive size. The great modifications in the skeleton that have accompanied these changes are well shown in the series of beautiful skeletons, while other exhibits illustrate the structure of the skull and teeth and the changes that take place with age.

Skeletons of Modern Horses

The similarity in structure (homology) of the skeletons of horse and man is brought out in the exhibit of a rearing horse, controlled by man. A comparison will show that although very different in proportions the bones of the one correspond with those of the other.

There is also a skeleton of a Russian Wolf-hound and a few smaller types for comparison.

The collection includes some noteworthy horses such as Sysonby, Lee Axworthy and the Arab stallion Nimr.

SOUTHWEST WING

MINERALS AND GEMS

The southwest wing comprises the Morgan Memorial Hall of Minerals and Gems. This hall, through the gift of Mr. George F. Baker has been remodeled to contain the General Collection of Minerals and the Morgan Gem Collection, thus constituting a memorial to the great services of Mr. J. Pierpont Morgan as a Founder and Benefactor of the Museum.

Of these, the General Collection of Minerals is without question one of the finest mineral collections to be found in the world, ranking with that of the British Museum and the Jardin des Plantes. It is composed chiefly of the well-known Bement Collection, presented to the Museum in 1900 by the late Mr. J. Pierpont Morgan. Although remarkably complete in its representation of most of the mineral species known to science, this collection is especially noteworthy for its assemblage of splendid examples of the commoner and more widely distributed minerals.

The visitor should begin with the first of the table cases, to the left of the entrance, and proceed from left to right along each side of every case, advancing through the south row of cases and returning through the north row. The different species are divided within the case by narrow strips between the mounts, and each case is furnished with a descriptive label referring to its contents and indicating the wall case which contains large and handsome specimens of the same species. To the right of the entrance will be found cases in which the subject of Crystallization is presented by a series of models. This series, as well

MORGAN MEMORIAL HALL OF MINERALS AND GEMS

QUARTZ CRYSTAL

A single crystal from Auburn, Maine, of quartz, measuring 26×19×13½ inches and weighing 253 pounds.

as other explanatory exhibits in adjoining cases, constitutes an important key to the understanding and appreciation of the general mineral collection.

The cases occupying the middle of the hall contain the Morgan Gem Collection, comprising the valuable series of gems and precious stones also presented by J. Pierpont Morgan, to which have been added from time to time noteworthy specimens given by other friends of the Museum.

The Morgan collection includes the series of American gems assembled by Tiffany and Company for the Paris Exposition of 1889 and the series of foreign gems and gem stones exhibited at the Paris Exposition of 1900.

The installation comprises examples of those minerals which are used for gems and for ornamental objects and consists of rough, uncut material and of fashioned gem stones and carved objects. All of the specimens exhibited have been chosen with great care and are not only thoroughly representative but include many examples which are unique in size, beauty of coloring and perfection of execution, reflecting the very highest standards of the art of the lapidary. Here again explanatory labels are used to give meaning and weight to the exhibit, not merely as a display of jewelry material but as a complete visual exposition of the knowledge of gem stones.

The visitor should proceed from the entrance along the north row of cases, returning along the south row. The case containing the Sapphires and Rubies, near the beginning of the series, presents a particularly fine display of these gems. Close by will be found a large and varied assemblage of Aquamarines embracing many gems of exceptional size and color. The cases devoted to Rock Crystal contain a number of carved and engraved objects of rare beauty and value. The handsome semi-precious stone Kunzite is represented by especially large and fine examples to be found toward the middle of the series. An interesting exhibit illustrating the primitive and antique use of gems is displayed in cases in the south row near the entrance. This includes many engraved cylinders of great age and the famous Babylonian ax-head of banded agate. An exquisitely carved statuette of blue Chalcedony, the gift of Mr. Charles Lanier, will be found in the center of the installation. There is also the second largest boulder of jadeite yet discovered.

Southwest Pavilion

COLLECTIONS FROM THE PACIFIC ISLANDS

On entering the *Southwest Pavilion* beyond the Hall of Minerals the visitor faces groups representing the natives of the Pacific Islands. Directly in the center is a Tahitian priest taking part in the fire-walking

ceremony, in which the participants walk over heated boulders of lava. On each side is a group showing natives engaged in typical activities,—grating cocoanut, preparing kava, or plaiting pandanus.

Near the entrance is a fine Hawaiian feather cape, such as was formerly worn by the highest ranks of Hawaiian society. Red and yellow honeysucker feathers completely hide the netted twine foundation. The value of these garments was proportionate to the enormous labor expended on their manufacture.

The hall is roughly divided into two main sections. In the eastern half are exhibited the collections from Polynesia and Micronesia, while the western half is devoted to New Guinea, Melanesia and Australia.

HAWAIIAN FEATHER CLOAK

However, it proved impossible to be wholly consistent and to separate Melanesian Fiji from Samoa and Tonga; for practical reasons the New Zealand specimens are displayed in the tower.

In the Polynesian section the examples of decorated native bark cloth (tapa) are especially noteworthy, and a number of canoe models remind us that these people are daring seafarers. A series of ceremonial adzes from the Cook Islands in the northeastern quarter of the hall shows aboriginal carving at its highest level.

In the western section the elaborately carved sacred masks, about 14 feet back of the Tahitian priest, illustrate the æsthetic tendencies of Melanesia, which are also apparent in a carved pole set on top of a vertical case. Very different from these artistic manifestations are the carvings

of the New Zealanders (Maori) characterized by the dominant spiral motive. A series of dried and tattooed Maori heads forms one of the most remarkable exhibits in the Museum. (See *Guide Leaflet* No. 71, The Maoris and their Arts.)

Near the boundary between the two main sections are the Australia cases with numerous boomerangs and very crude stone tools, which should be compared with those in the archæological hall (p. 76). In the northwest corner of the hall are shields, clubs, carvings and household utensils from New Guinea.

West Wing

COLLECTIONS FROM THE PHILIPPINE ISLANDS

The hall due north of the Pacific Islands hall is devoted mainly to the Philippine Islands, but some of the cases in the northwest corner house collections from other parts of Malaysia, such as the interesting series of marionettes from Java.

At the right of the entrance is a case containing life casts of faces, nose and hair from the different races represented in this hall. Also charts of stature and head form, with distribution maps. (See *Handbook* No. 8, The Peoples of the Philippines.)

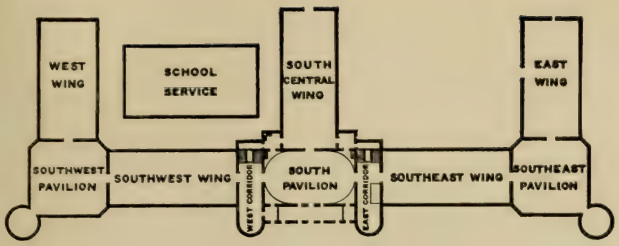
In the center of the hall is a model of a bamboo-walled and thatch-roofed house; at the far end a native tree house dominates the scene; and on your left may be seen the model of a woman weaving a garment on a native loom.

The visitor should note that, like the African Negroes, but unlike all other primitive stocks, the Malayan tribes represented in this hall used iron tools. The numerous iron weapons—spears, battle-axes, and krises (daggers with serpentine blades)—are especially remarkable.

On the west side of the hall will be found a number of synoptic exhibits of native krises, shields, fabrics, basketry and ceramics. Pottery is not highly developed in this area, but the textile arts flourish to a remarkable degree. The industrial life of the Bagobo of Mindanao is particularly well illustrated in the collections.

Much more primitive in their culture than the other Malaysians are the Negritos, a dark-skinned and frizzly-haired pygmy stock forming with similar groups in other parts of the world a distinct division of the Negro race. They are everywhere hunters, using the bow and arrow, and ignorant of agriculture. Their simple implements are shown in a table case in the northeastern section of the hall.

Return to the South Pavilion.



FIFTH FLOOR

LIBRARY, OFFICES, LABORATORIES, AND STUDY COLLECTIONS

The fifth floor is given over to the administrative offices, the offices and laboratories of the scientific departments, and the library.

On this floor are the workrooms of the Department of Vertebrate Palæontology, where the skeletons of fossil animals are prepared and mounted, and the laboratory where are made the beautiful models of invertebrates. In other rooms the varied work of preparing exhibits requires the services of a considerable number of artists and artisans.

These, like the other laboratories, are of necessity not open to the public.

WEST CORRIDOR

LIBRARY

The Library, as might be inferred, is devoted to works on natural history, anthropology and travel. It contains some 103,000 volumes which comprise not only the important periodicals of our own and foreign countries but also all representative and standard works on zoology, physical anthropology, ethnology, prehistory, archæology, geology and palæontology. The collection on vertebrate palæontology forms the Osborn Library of Vertebrate Palæontology, founded by President Henry Fairfield Osborn. It is located in the southeast wing.

The Reading Room of the Library is located in the west corridor and, with the exception of Sundays and holidays, is open to the public from 9 A.M. until 5 P.M. Those interested in consulting the books and periodicals are welcome to do so during these hours.

Twelve reading tables have been placed in various halls of the Museum, whose specially designed cases contain books pertinent to the exhibits. These may be consulted by applying to the guard.

PUBLICATIONS

The publications of the Museum fall naturally into two groups: technical and popular.

The former, comprising the *Anthropological Papers*, *Memoirs*, *Bulletin*, and *American Museum Novitates*, contain information gathered by the various expeditions, or derived from the study of material collected. The *Anthropological Papers*, as the title implies, are devoted to researches carried on under the auspices of the Department of Anthropology. The *Memoirs*, quarto in size, contain monographs, many of which demand large illustrations. The *Bulletin* contains the longer scientific papers, covering records of explorations and collections of the Museum. The *Novitates* comprise the shorter scientific contributions, descriptions of species, etc., which demand immediate publication. The scientific publications are distributed to libraries of scientific institutions and societies throughout the world, largely on an exchange basis.

The popular publications include *Natural History*, Journal of The American Museum of Natural History, *Guide Leaflets*, *Handbooks* and *General Guide*, and are intended for the information of the public. *Natural History*, begun as The Journal in 1900, is the means of promptly informing the Museum members of the work of the institution, giving the results of the many expeditions, telling of the collections made, or important information gathered. It describes interesting or noteworthy installations, and notes the accessions to the various departments, changes in the personnel of the Museum, and elections to Museum membership. In addition it contains articles of popluar scientific appeal. The illustrated *Guide Leaflets*, seventy-four of which have been published, deal with exhibits of particular interest or importance, such as the Habitat Groups of Birds, the Evolution of the Horse, Meteorites, Indians of Manhattan, calling attention to important objects on exhibition and giving information in regard to them. The *Handbooks*, twelve of which have been issued, deal with subjects illustrated by the collections, rather than with the objects themselves. They are frequently used as text-books. Thus, the Indians of the Plains, by Dr. Wissler, is not merely a guide to the exhibition hall, but tells of the life and customs of these Indians, their language, political organizations, religious beliefs and ceremonies.

The distribution of these popular publications is a part of the educational work of the Museum, as are exhibits and lectures, and they have been sometimes sold below the cost of publication, as is done by other museums. (See list at back of Guide.)

An *Annual Report* is issued yearly.

STUDY COLLECTIONS

The scientific side of the work of the Museum is based upon its explorations and study collections.

The Study Collections, as the name implies, are not only for the benefit of students but they preserve a record of our vanishing animal life and of the life and customs of our own and other primitive peoples.

In the case of natural history, the vast majority of the specimens are in the study series, not only because they would ultimately be ruined by exposure to light but because the display of all material would only confuse the visitor. Moreover, no museum has room to show everything. A careful selection is made of objects of the greatest educational value, and these are so displayed as to enhance their interest and attractiveness.

The Study Collections are, briefly, as follows:

Mineralogy

Most of the mineral specimens are on exhibition, but the overflow from the public cases forms a study series of no mean proportions.

Geology

The study collections comprise, among other things, the Hitchcock series of rocks illustrating thirteen geological sections across the States of Vermont and New Hampshire; a complete set of duplicate specimens from the United States geological survey of the Fortieth Parallel; a series illustrating the early geological survey of Pennsylvania; a complete typical series of rocks and microscopic thin sections illustrating Rosenbusch's manual of petrography; large series of American rocks; a complete series typifying the rocks encountered in driving the Simplon tunnel, Switzerland; many ores and economic specimens.

Vertebrate Palæontology

The study collections comprise over 20,000 catalogued specimens of fossil mammals, 6,000 fossil reptiles and amphibians, and a few hundred fossil birds. Most of these are from the western United States. The collections of fossil horses, Eocene mammals and Cretaceous dinosaurs are unrivaled. The fossil rhinoceroses, camels, oreodonts, Carnivora, Fayûm, Pampean, Asiatic and Patagonian mammals, Jurassic dinosaurs, Permian reptiles, turtles, etc., are likewise of the first rank. They include more than one thousand type specimens of fossil mammals and several hundred type specimens of fossil reptiles and amphibians. The fossil fishes are at present in the Department of Ichthyology.

Invertebrate Palæontology

Great numbers of fossil invertebrates, representing many important groups and including a large number of types: foremost among these is the James Hall collection of New York State fossils which contains about 7000 types.

HOW SPECIMENS ARE CARED FOR

How skins of Mammals are stored

DEPARTMENT OF PREPARATION

The new Asiatic Hall used temporarily for the department of preparation.
In the foreground a group of Nilgai obtained by the Vernay-Faunthorpe Expedition.

Lower Invertebrates

About 65,000 specimens of protozoans, sponges, polyps, starfishes, sea urchins, worms, crustaceans, myriapods and chordates. The collection of recent mollusks comprises about 20,000 species, including especially the Jay and Haines collections and large series from Africa.

Entomology

The insects and spiders forming our general collection consist of about 1,000,000 specimens; among them the types of many species. Many students in this branch of natural history visit our laboratories in the course of a year to take advantage of the collection.

Ichthyology

The fishes comprise about 10,000 specimens, mainly preserved in alcohol; among them many fresh-water fishes from Africa, including about 100 types, and good series from China.

The fossil fish collection is one of the largest, if not the largest, in America, comprising about 10,000 catalogued specimens; it includes the collection of Palæozoic fishes, especially Arthrodires, made by Professor J. S. Newberry, and a series of fossil fishes from Europe and North America.

Herpetology

The collection of frogs, salamanders and reptiles numbers about 15,000 specimens.

Ornithology

About nine-tenths of the study collections, which include skins, nests and eggs, are from the Western Hemisphere. From North America are important series representing the Middle Atlantic States, California, Texas and Arizona, also Mexico, Nicaragua and Panama. South America is represented by collections from Colombia, Ecuador, Peru, Venezuela, and Matto Grosso, Brazil.

There are fine collections from the Congo region, Africa, also from Polynesia, and there are unusually large collections of sea birds.

The Lawrence and Maximilian collections are particularly important because of the large number of types they contain.

Mammalogy

Aside from the mammals of North America, great and small, the collection includes extensive series from South America, Mongolia, Africa, especially the Congo region, and Australia.

Comparative Anatomy

The study collection comprises a large number of preserved specimens of many kinds of animals suitable for comparative anatomical investigations, and a general osteological collection for the use of research workers and postgraduate students.

Anthropology

The human skeleton material includes the large Felix von Luschan collection, representing the racial types of existing man, and in addition a number of special collections from the American Indians.

The ethnological study collections comprise extensive series from the Philippine Islands, Siberia, China, Central and South Africa and the various culture areas in North America.

In archæology there are large series of characteristic stone objects from the various states of the union. There are full collections from excavated sites in California, New York, Georgia, Kentucky, Tennessee, Arizona, and New Mexico, and a special series from the Trenton Valley. There is also much material from Mexico, Bolivia, Peru, Europe and China.

The Library

The Museum Library, located on the fifth floor, contains about 103,000 volumes on various branches of natural history (except botany), anthropology and travel. It has an unusually fine collection of scientific periodicals and standard classics. Like other Museum libraries, it is of necessity adapted for reference only, but may be consulted freely by the public during the hours that the Museum is open, except on Sundays and holidays. The Osborn Library, founded by President Henry Fairfield Osborn, is also on the fifth floor and contains all the important works on vertebrate palæontology.

Workshops

An important part of the Museum, not seen by the public, is the workshops, located in the basement and provided with machinery of the most improved pattern. Here, among other things, are constructed the various types of cases used in the Museum, including the light, metal-frame case, devised in the institution.

Another most important part is the fully equipped printing establishment where most of the printing of the Museum is done.

Still other rooms, which, of necessity, are not open to the public, are the laboratories, wherein is carried on the varied work of preparing exhibits, work which calls for the services of a very considerable number of artists and artisans.

Here are cast, modeled or mounted, the figures for the many groups from Man to Myxine; here leaves are made to grow and flowers to bloom as accessories[1] for beasts, birds and fishes, to say nothing of reptiles and amphibians, and here, with painstaking care, are slowly created in glass and wax the magnified copies of invertebrates.

From all this may be gathered that a museum is a very busy place, much more so than the casual visitor is apt to imagine. In fact, a very good museum man has said that a museum is much like an iceberg, seven-eighths of it under water and invisible.

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[1]See *Guide Leaflet* No. 54.

POPULAR PUBLICATIONS

Relating to the Exhibits or to the Work of the Museum

These are plainly written accounts of the exhibits or of the subjects illustrated by the exhibits and are intended to give much more information than could be put on labels.

They may be purchased at the Sales Booth in Memorial Hall or from the Librarian.

Leaflets and Handbooks not included in this list are out of print and, in most cases, will not be reprinted.

Prices are net; postage is extra (3 cents for each Leaflet and 10 cents for each Handbook).

Mail orders should be accompanied by money orders, checks or stamps (not cash), to cover the purchase price and mailing cost, and may be addressed to

THE LIBRARIAN
The American Museum of Natural History
77th Street and Central Park West
New York, N. Y.

HANDBOOKS

These deal with subjects illustrated by the collections, rather than with the objects themselves. They are frequently used as text-books.

No. 1. North American Indians of the Plains. BY CLARK WISSLER, Ph.D., Curator-in-chief, Department of Anthropology. *Third edition.* September, 1927. 172 pages, maps and illustrations. *Cloth, 75 cents.*

This gives an account of the Material Culture, Social Organization, Religion, Ceremonies, Art and Languages of the Plains Indians of North America.

No. 2. Indians of the Southwest. BY PLINY EARLE GODDARD, Ph.D. *Third edition.* July, 1927. 201 pages, maps and many illustrations. *Cloth, 75 cents.*

A résumé of our present knowledge of these interesting Indians. Among the subjects treated are the Spanish Conquest, Cliff Dwellings, Native Weaving, the Potter's Art and the Hopi Snake-Dance.

No. 3. Ancient Civilizations of Mexico and Central America. BY HERBERT J. SPINDEN, Ph.D. *Third edition, revised and enlarged.* September, 1928. 270 pages, 75 illustrations. *Cloth,* $1.00.

Intended as a general commentary and explanation of the more important phases of the ancient life and history of the Indians of Mexico and Central America, popularly considered as Aztecs, but actually including a number of distinct though related races, notably the Maya.

No. 4. Animals of the Past. An account of some of the Creatures of the Ancient World. By Frederic A. Lucas, Sc.D. *Seventh and enlarged edition.* July, 1929. 221 pages, numerous illustrations. *Cloth, 75 cents.*

Tells of the mammoth and mastodon, of the giants among birds, the sea lizards, the huge dinosaurs and other creatures of the past.

No. 8. Peoples of the Philippines. By A. L. Kroeber, Professor of Anthropology, University of California. *Second and revised edition.* October, 1928. 224 pages, maps and illustrations. *Cloth,* $1.00.

Their Religion, Arts, and Occupations.

No. 9. Birds of the New York City Region. By Ludlow Griscom. November, 1923. 400 pages, map and illustrations. *Cloth,* $1.00.

Gives detailed information about the birds of this region and tells where and when they are to be found.

No. 10. Indians of the Northwest Coast. By Pliny Earle Goddard, Ph.D. August, 1924. 176 pages, many illustrations. *Cloth, 75 cents.*

Tells of the customs, religion and art of these expert workers in wood and carvers of totem poles.

No. 11. Old Civilizations of Inca Land. By Charles W. Mead. December, 1924. 117 pages, many illustrations. *Cloth, 65 cents.*

Describes the arts and industries of the highly civilized Incas, their marvelous textiles and extraordinary skill in stone work.

No. 12 The Story of the Minerals. By Herbert P. Whitlock, C.E., Curator of Mineralogy. December, 1925. 144 pages, colored frontispiece and many illustrations. *Cloth, 75 cents.*

Puts into simple form the "How?" and the "Why?" of mineralogy.

ILLUSTRATED GUIDE LEAFLETS

These describe some exhibit, or series of exhibits, of special interest or importance, or may deal with the contents of an entire hall.

No. 28. The Habitat Groups of North American Birds. By Frank M. Chapman, Curator of Ornithology. *Fifth edition.* 1930. 66 pages, 36 illustrations. *Price, 25 cents.*

These celebrated groups are designed to illustrate not only the habits but also the haunts, or habitats, of the species shown. The backgrounds are careful studies from nature and each represents some definite locality. Twenty-eight of these groups are shown in this leaflet.

No. 36. The Evolution of the Horse in Nature and under Domestication. By W. D. Matthew, Ph.D., and S. H. Chubb. *Fifth revised edition.* June, 1927. 67 pages, 39 illustrations. *Price,* 25 *cents.*

The geologic history of the Horse affords the most complete and convincing illustration of evolution among mammals. This leaflet, based upon material in this Museum, describes the successive stages in its evolution from the four-toed "*Eohippus* no bigger than a fox" to the single-toed horse of to-day.

No. 38. Our Common Butterflies. By F. E. Lutz, Curator of Entomology, and F. E. Watson. *Fifth and revised edition.* May, 1926. 20 pages, two color plates and many illustrations. *Price,* 15 *cents.*

Describes and figures, life size, the majority of butterflies seen not only in the vicinity of New York City but in our eastern states generally.

No. 39. How to Collect and Preserve Insects. By F. E. Lutz, Curator of Entomology. *Sixth edition.* September, 1927. 27 pages, 12 illustrations. *Price,* 10 *cents.*

The purpose of this work is sufficiently explained by its title. It will be found very useful by those wishing to collect and study insects.

No. 41. The Indians of Manhattan Island and Vicinity. By Alanson Skinner. *Fourth edition.* July, 1926. 63 pages, 27 illustrations. *Price,* 20 *cents.*

There is no subject which makes a more forceful appeal to the student, the historian or even the general reader than that of the native inhabitants of what is now Greater New York, yet there is no subject on which it is more difficult to obtain information. It is the object of this leaflet to briefly supply this information so far as it is available.

No. 42. The Big Tree and Its Story. By George H. Sherwood, Curator, Department of Public Education. *Fifth edition.* December, 1929. 31 pages, 9 illustrations. *Price,* 15 *cents.*

Includes the labels by Ellsworth Huntington, telling how the relation of climate to history is recorded by the Big Trees.

No. 45. A Brief Guide to Public Health Exhibits in The American Museum of Natural History. By Laurence V. Coleman. *Second edition.* February, 1929. 15 pages. *Price,* 5 *cents.*

Dealing with water supply, disposal of municipal wastes, and insect-borne diseases; an outline for teachers and students.

No. 46. Peruvian Art. A Help for Students of Design. By Charles W. Mead. *Fifth edition.* December, 1929. 24 pages, 9 full-page plates. *Price,* 10 *cents.*

Shows how the strange designs on the textiles and pottery of the ancient Peruvians are really representations of birds, of beasts, and of fishes that have gradually been transformed from pictures of animals to curious figures in which only the trained student can recognize the creatures depicted.

No. 49. The Collection of Minerals. By Herbert P. Whitlock. C.E., Curator of Mineralogy. *Third edition.* June, 1926. 30 pages, 22 illustrations. *Price,* 15 *cents.*

Describes in a general way the collection of minerals in Morgan Hall.

No. 50. Indian Beadwork. By Clark Wissler, Ph.D., Curator-in-Chief, Department of Anthropology. *Second edition.* May, 1927. 31 pages, 25 illustrations. *Price,* 20 *cents.*

A description of the technique employed in bead and quill work together with a series of design motives from typical Plains Indian beadwork.

No. 51. A First Chapter in Natural History. By Frederic A. Lucas. Revised edition in preparation.

A simple statement of the main principles of Evolution, Geographical Distribution, Classification and Nomenclature.

No. 52. The Hall of the Age of Man. By Henry Fairfield Osborn. *Fifth edition, revised and enlarged.* October, 1929. 54 pages, numerous illustrations. *Price,* 30 *cents.*

Describes the exhibits illustrating what is known of the origin, relationships and early history of man as deduced from his remains and implements, also the paintings by Knight showing the animals by which man was surrounded in the early stages of his existence.

No. 53. The Story of Museum Groups. By Frederic A. Lucas. *Fourth edition.* 40 pages, many illustrations. January, 1926. *Price,* 15 *cents.*

A sketch of some of the more important steps that have led to the present beautiful habitat groups, with notes on the improved methods that have made them possible and pictures of many notable pieces.

No. 54. Plants of Wax. By Laurence Vail Coleman. *Second edition.* February, 1928. 16 pages, many illustrations. *Price,* 15 *cents.*

Tells how reproductions of flowers and foliage, such as are used in the various groups, are made.

No. 55. Basketry Designs of the Mission Indians. By A. L. Kroeber, Ph.D., Professor of Anthropology, University of California. 20 pages, 8 full-page plates. *Second edition.* November, 1926. *Price,* 15 *cents.*

Basket-making among the Mission Indians with special emphasis on an analysis of designs.

No. 56. The Geology of New York City and Vicinity. By Chester A. Reeds, Ph.D., Curator of Geology and Invertebrate Palæontology. *Second edition,* April, 1930. 36 pages, many illustrations. *Price,* 20 *cents.*

Gives a short résumé of the outstanding geologic features of the region. The age of the rocks, their distribution and the fossils found therein are also discussed.

No. 57. Guide to the Hall of Mammals. By Frederic A. Lucas, *Second edition.* July, 1926. 16 pages, folding plate, and illustrations. *Price,* 10 *cents.*

Designed particularly for use in connection with the exhibits.

No. 59. The Preparation of Rough Skeletons. By Frederic A. Lucas. January, 1927. 15 pages, 11 illustrations. *Price,* 10 *cents.*

Skeletons are necessary not only for the student of the life of to-day, but for the palæontologist.

No 60. The Story of the Yosemite Valley. By Francois E. Matthes, Ph.D. July, 1924. 20 pages, illustrated. *Price,* 10 *cents.*

Especially intended for use with the relief model in the Hall of Geology.

No. 61. The Capture and Preservation of Small Mammals for Study. By H. E. Anthony, Curator, Department of Mammalogy. *Second edition.* September, 1927. 53 pages, 24 illustrations. *Price,* 15 *cents.*

An important manual for collectors and travelers interested in the small quadrupeds that are so little seen and are yet of great importance.

No. 62. Mastodons and Mammoths of North America. By Henry Fairfield Osborn. May, 1926. 46 pages, colored frontispiece and many illustrations. *Price,* 20 *cents.*

Tells of the rise of the Elephant Family, of their wanderings into distant lands and their decline. The story of the Warren Mastodon is told in full.

No. 63. Indian Costumes in the United States. By Clark Wissler, Curator-in-Chief, Department of Anthropology. July, 1926. 32 pages, 19 illustrations. *Price,* 15 *cents.*

Takes up geographical variations in American Indian costume—materials, patterns, and decoration.

No. 64. Meteorites, Meteors and Shooting Stars. By Frederic A. Lucas. *Second edition,* 1930. 24 pages, 15 illustrations. *Price,* 15 *cents.*

A popular account of these visitors from the sky which have aroused the interest of beholders from the earliest times and have been variously regarded as messages from the gods, parts of comets, and fragments of a lost world.

No. 65. The Art of the Lapidary. By Herbert P. Whitlock, C.E., Curator, Department of Mineralogy. 29 pages, 34 illustrations. December, 1926. *Price,* 15 *cents.*

Tells how diamonds and other precious stones are cut.

No. 66. Seasonal Records of Geologic Time. By Chester A. Reeds, Curator of Geology. 12 pages, 8 illustrations. *Price,* 10 *cents.*

The Big Trees of California record the climate of 3000 years past, but stratified clays, such as are found along the Hudson River, and in many other parts of the world, tell us of the climate of thousands of years before that.

No. 67. Deep Sea Fishes. By Louis Hussakof. *Third edition.* 1925. 6 pages, 8 illustrations. *Price,* 10 *cents.*

About the strange fishes that dwell in eternal night and wintry cold in the depths of the sea.

No. 68. Bird Hunting in Central Park. By Ludlow Griscom. December, 1926. 11 pages, 4 illustrations. *Price,* 5 *cents.*

Shows how much may be done by those who can not go far afield; contains a list of all birds seen in Central Park.

No. 69. Distributional List of the Reptiles and Amphibians of the New York City Region. By G. Kingsley Noble, Curator of Herpetology. *Second edition.* March, 1929. 9 pages. *Price,* 5 *cents.*

A preliminary statement of the general ranges of our local reptiles and amphibians.

No. 70. The Hall of Dinosaurs. By Frederic A. Lucas. *Second edition.* December, 1928. 20 pages, 15 illustrations. *Price,* 10 *cents.*

A brief history of the Dinosaurs, with special reference to the Museum exhibit.

No. 71. The Maoris and Their Arts. By Margaret Mead, Assistant Curator of Ethnology. May, 1928. 38 pages, 23 illustrations. *Price,* 15 *cents.*

Covers work in greenstone, wood-work, weapons, textiles and tattooing, with special reference to decorative art.

No. 72. A Drama of the Microscope. By Roy Waldo Miner, Curator of Marine Life. October, 1928. 16 pages, many illustrations. *Price,* 10 *cents.*

Describes the new Rotifer group and contains a key to the numerous animals represented.

No. 73. Pottery of the Southwestern Indians. By Pliny Earle Goddard, Ph.D. December, 1928. 30 pages, 22 illustrations. *Price,* 15 *cents.*

Describes the methods of making the pottery as well as sequence of types.

No. 74. Outposts of the Sea. By Roy Waldo Miner, Curator of Marine Life. June, 1929. 14 pages, numerous illustrations. *Price* 10 *cents.*

Describes the abundant animal life of the tidal zone—that strip of shore which is alternately submerged and laid bare by the daily rise and fall of the tides.

General Guide to the Exhibition Halls. *Sixteenth edition.* 1930. 127 pages, many illustrations. *Price,* 35 *cents.*

Natural History, a bi-monthly magazine containing articles of general interest on natural history and travel, profusely illustrated. *Subscription price* $3.00 *annually; separate numbers* $.50.

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